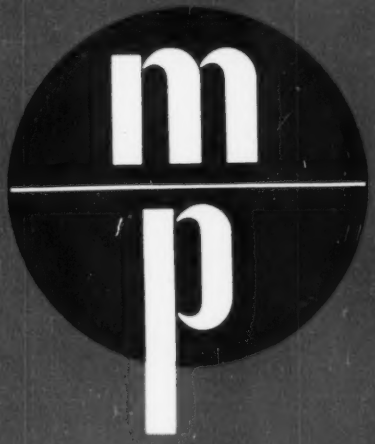
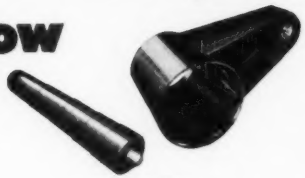
MODERN PLASTICS



JULY 1950

It pays to use your custom molder's know-how

...when you want something to look better and cost less



PROJECT
Snap-locking carafe handle

CUSTOMER
Sparkletts Drinking Water Corporation
Los Angeles

MOLDER
F. E. Reinhold, Mfr., Los Angeles

MATERIAL
Durez general-purpose phenolic plastic

No. 19 in a Series on Plastics Skill at Work . . .

● Californians who refresh themselves with Sparkletts spring water voiced no complaint about the old metal and rubber rack-type carafe handle. Even so, the Sparkletts people figured there might be a smarter design, new product interest, and lower cost, if the problem were attacked from a new angle.

An experienced custom molder was called in, given the objectives, and asked for suggestions. While custom molders are essentially engineers and production men, their knowledge of plastics properties is always useful in matters of design. Sparkletts found it extremely so.

Using the freedom of design permitted by plastics, the molder conceived and produced a two-piece holder of strong, lustrous Durez that has won many compliments and much new business for the bottling firm.

Success from the cost angle was spectacular too . . . the Durez pouring holder costs only half as much as the metal one it replaced. The old holder required twenty rivets and a rubber handle cover. On the new one, the assembling screw and socket and the tapered grip are molded in. The self-locking plunger latch allows the holder to revolve freely around the bottle neck.

Whether or not you have a full-scale design department, your custom molder can take a constructive part in your new or revised product planning. Let him help you profit from the versatile properties of Durez and other plastics. Durez phenolics specialists are also available for free consultation.

A hit with plastics users everywhere is the handy "Durez Check-Chart." Write for yours. Durez Plastics & Chemicals, Inc., 127 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

Catalin...PARTY TO THE PUBLIC'S BUYING PLEASURE!

The Rock-Ola Automatic Phonograph, above, picture-demonstrates the irresistible coin appeal of Catalin. The dramatically brilliant backlighted, fluted pilasters... the sweeping central panel and its identifying name... the kaleidoscopic frontal inserts—all, are beautifully effective in the colorfully rich selling magnetism of Catalin—the gem of plastics!

No other plastic material offers so much to those who design for the public's participation. Whether the project be a music machine, drink dispenser or automatic vendor of specialties, the use of Catalin becomes an impelling party to increased patronage.

In Catalin, you have immediate access to the available abundance of stock shapes, as well as sheets, rods and tubes. Selections include complete ranges of transparent, translucent and opaque colors. Should your plans require specially cast components, Catalin's costs for molding-to-specification are favorably advantageous.

Product designers aware of a customer preference for color interpreted in its richest and most appealing sense, turn naturally to Catalin. Our service staff will be glad to help you in planning your setting for the gem of plastics. Inquiries invited.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N. Y.

CAST RESINS • LIQUID RESINS • MOLDING COMPOUNDS

MODERN PLASTICS*

VOLUME 27 JULY 1950 NUMBER 11

CONTENTS

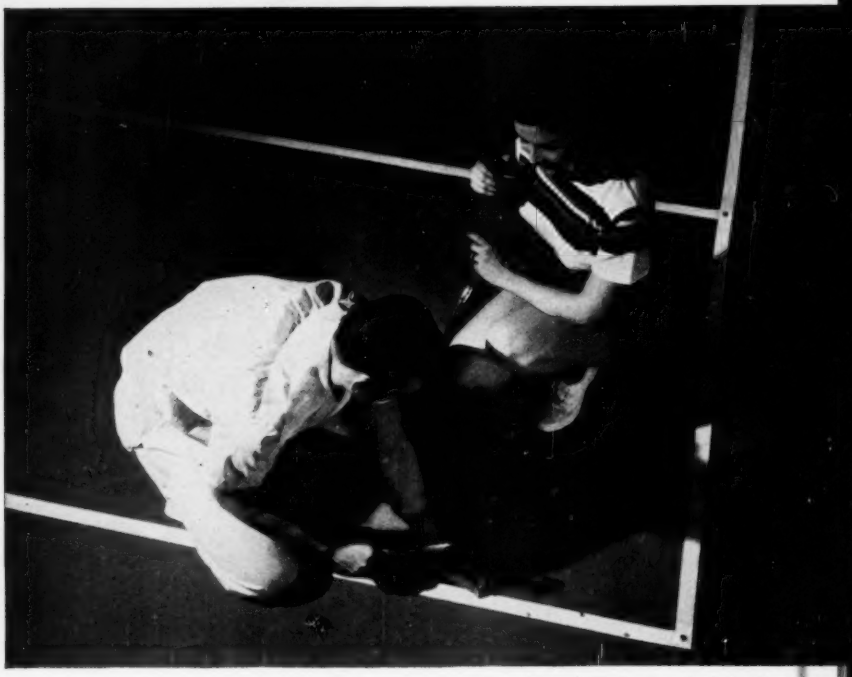
PUBLICATION OFFICE: Orange, Conn. Executive and Editorial Office: 122 E. 42nd St., New York 17, N. Y. Published each month by Modern Plastics, Inc. Entered as second class matter at the Post Office at Orange, Conn., under the act of March 3, 1879.

Subscription $5.00 a year, $8.00 for two years in the U.S., its possessions, and South America. Canadian subscription $5.00 a year, $8.00 for two years. All other countries $5.00 a year, $8.00 for two years, payable in U. S. currency. Price of this issue 75 cents per copy. Printed in the U. S. A. by The Wilson H. Lee Co., Orange, Connecticut.

*Reg. U. S. Pat. Office

Another new development using

B. F. Goodrich Chemical Company ***raw materials***



"Rextrude" tape by The Rex Corp., Cambridge, Mass.

Better service from every angle —WITH GEON!

IT seems there's no limit to what you can do with Geon polyvinyl materials in developing profitable new products.

Take the tennis court tape pictured here, for example. It scores with tennis players wherever it's used. And it's easy to see why. Made from Geon plastic, it has exceptional resistance to aging and weathering. Acids, alkalies and sunlight have practically no effect on it.

It stays white, won't rot, is waterproof. Neither calcium chloride nor chemical weed killers used on courts harm it.

Compare these Geon advantages to ordinary cotton tapes—which generally rot, stain, break or discolor in time. From every angle, there's better service with Geon!

Geon materials have launched many products on successful careers. For Geon helps *improve* products—often is the key to developing entirely new ones. Better sales and profits follow—naturally.

Geon can be calendered, extruded, molded or used as a coating. We supply it in raw material form only—no finished products. For technical bulletins and helpful service, please write Dept. GA-7, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Chicago Molded Plastics, of course!

● *Strikingly beautiful, with its smooth surfaces of gleaming white, the new Maytag Automatic Washer now brings to the automatic field the advantages of Maytag's sound engineering and efficient, dependable performance. At the heart of this new machine is a new Gyratator in the characteristic Maytag red giving the housewife, for the first time, the advantages of the Gyrafoam washing principle in an automatic washer. Through its experience in building literally millions of washers, Maytag has found that the Gyratator of molded phenolic plastics, more than any other material, resists the action of modern soaps and detergent solutions. It keeps its smooth, sleek surfaces through years of constant use and combines super-efficient cleansing action with maximum gentleness to fabrics.*

* * * *

It is natural that Maytag, who pioneered and perfected the modern agitator-type washing machine, should turn to Chicago Molded as a major source of supply. For CMPC originated the modern technique of molding agitators. And it is particularly significant that the first Gyratator mold, built by CMPC for Maytag nine years ago, is among the several molds in regular daily production here producing agitators for Maytag washers of the conventional and automatic types.

The ability of Chicago Molded to produce right from the start is no mere accident. It comes as the result of more than 30 years in pioneering many of the most important commercial applications for plastics today . . . plus unsurpassed facilities for all types of plastics molding . . . compression, plunger, and injection.

This same experience and these same facilities are at your disposal for your next plastics molding job. A consultation with a Chicago Molded engineer involves no obligation on your part. Just write or phone.

CHICAGO MOLDED PRODUCTS CORPORATION

1046 N. Kolmar Ave. Chicago 51, Illinois

Representatives in principal industrial centers

COMPRESSION, INJECTION AND PLUNGER MOLDING OF ALL PLASTIC MATERIAL

EDITORIAL

The Public Learns More About Plastics

A most important development of the past few months has been the increasing attention paid to plastics by consumer magazine editors, as evidenced by a number of recently published articles.

In April, *Liberty* devoted seven pages to the subject "At Home With Plastics," illustrating a living room, bedroom, bath, and kitchen and describing the plastics used therein. In April, also, *Fortune* ran a 10-page section entitled "A 1950 Guide to the Plastics," highly detailed and with full-color illustrations. In May, *Living* magazine did a three-page feature on "It's Fun to Work With Plastics," building the story largely around hobbycraft in transparent materials. In its May 20 issue, the all-powerful *Saturday Evening Post* produced a major color feature entitled "The World Goes Plastic". Even the roto section of the May 21 edition of the *Sunday News*, New York, ran a page on plastics.

While all these presentations left much to be desired in the way of technical accuracy and balance of emphasis, all of them had three important common denominators: enthusiasm for plastics, a healthy respect for the accomplishments of this industry, and a friendly, easy approach to the problem of introducing the reader to the admittedly monstrous names assigned to plastics materials.

In every one of these cases, the writer said to his readers in effect: "You'd better get acquainted with these plastics materials so that you can make the best use of them." In every case he said: "Don't let these complicated names disturb you; in time you'll learn them and know what they mean." In every case the writer said: "Plastics are wonderful modern materials which can enrich your life and improve your standard of living."

Most significant factor in the whole thing was the conspicuous absence of any mention of misapplication. Indeed, the onus of responsibility for consumer satisfaction in plastics products was placed directly on the shoulders of the reader. It was put up to the public to learn how to buy and use plastics.

Every person in the plastics industry who has ever attempted to tell a lay audience about plastics can appreciate the magnificent job done by these writers, themselves laymen. A careful study of their teaching techniques can help plastics industry people improve their advertising, sales promotion, labeling, and public relations. The biggest stymie in this industry's public relations has always been the difficulty of familiarizing consumers with the different types and uses of plastics materials. Now these magazine writings have developed new methods for beating that stymie.

To the public relations executives in the industry, our heartiest congratulations on their share in promoting and facilitating this development. To S.P.I. and P.M.M.A., also, a bouquet for work well done in helping to prevent confusion and in assuring that the common interest of the industry would best be served in these articles.

But all industry and company public relations could never have accomplished this excellent promotion work had it not been for the fact that the public today likes plastics. As we said in our April lead: "Public appreciation of plastics is at the highest point in history!"

President and Publisher
CHARLES A. BRESKIN

Editorial Staff
Editor: HIRAM MCCANN
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Senior Editor: R. L. VAN BOSKIRK
Managing Editor: A. PAUL PECK
Art Director: DONALD R. RUTHER
Associate Editor: WARREN H. GOODMAN
Assistant Managing Editor: E. S. BLACK
Assistant Editor: JOAN MOISSEIFF
Midwestern Editor: VAL WRIGHT
European Editor: HOWARD WILLIAMS
Readers Service: EMMA TURAK

Business Staff
Vice President and General Manager: ALAN S. COLE

P. H. Backstrom — B. W. Gussow
M. A. Olsen — W. F. Kennedy
J. M. Connors — N. B. Hasselriis
S. W. Jones, Jr. — J. C. Galloway
R. C. Beggs — S. S. Siegel

Promotion Manager: PHILIP W. MULLER
Production Manager: DANIEL M. BROADS
Asst. Production Manager: B. J. FARINA

Circulation Department
Circulation Manager: FREDERICK A. KLEIN
32 Broadway, New York 4, N. Y.
Tel., WHitehall 4-4782

Executive and Editorial Offices
122 E. 42nd St., New York 17, N. Y.
Tel., MUrray Hill 3-0655

Branch Offices
Chicago 1: 221 N. La Salle St.
J. M. Connors Tel., Financial 6-3450

Cleveland 14: 815 Superior Ave.
R. C. Beggs Tel., SUperior 1-0737

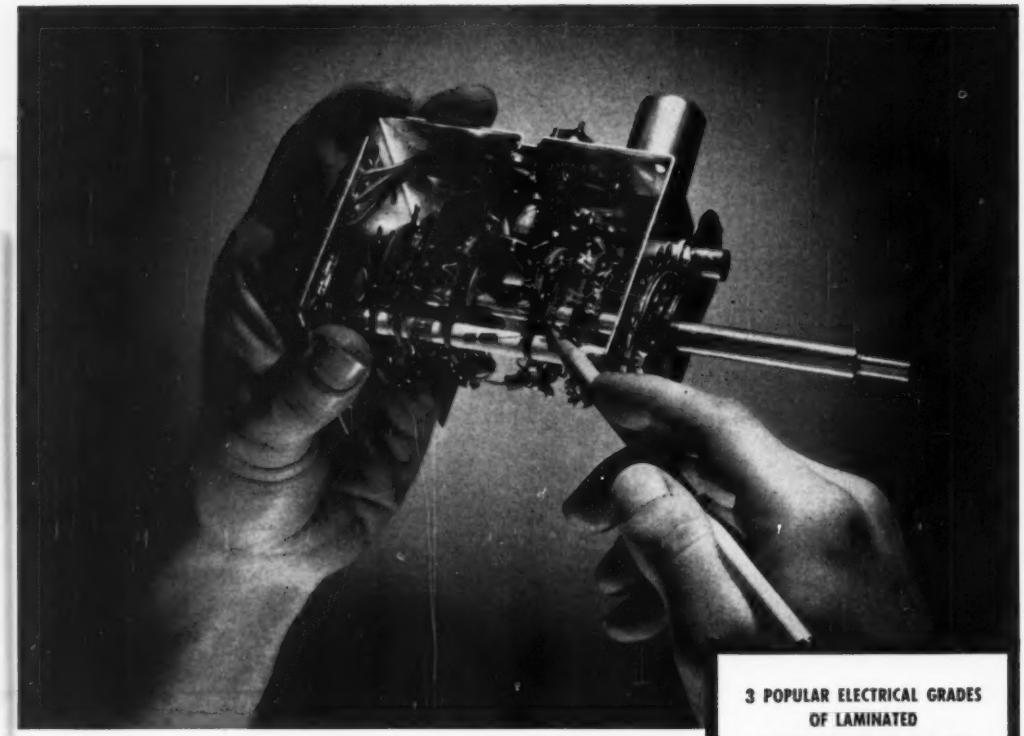
Los Angeles 17: 816 West Fifth St.
J. C. Galloway Tel., Mutual 8335

London, England: Transatlantic Publicity, Ltd., 20/21 Broad Street Ave., Blomfield St., London E.C.2
Advertising Manager: L. H. Dolaro
European Editor: Howard Williams

Member Audit Bureau of Circulations
MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

INSUROK T-725

Retains Its Properties ...even AFTER SANDING



That's why it is used in this Tarzian Tuner . . . standard in TV sets of 17 leading manufacturers

Most laminated insulation that can be punched depends largely upon high-resin content surface for the maintenance of its electrical properties under conditions of varying humidity. When sanded to close tolerances, this surface is removed—seriously impairing the electrical behavior of the material.

INSUROK T-725, however, is uniformly top-quality insulation throughout the sheet. Sand it and it is still better than most unsanded materials.

This is one of the reasons why Oak Manufacturing Company selected INSUROK T-725 for the components it makes for Sarkes Tarzian, who supplies tuning heads to 17 leading TV manufacturers. Investigate INSUROK T-725 for your product. Full information upon request.

3 POPULAR ELECTRICAL GRADES OF LAMINATED

INSUROK

T-725 An outstanding paper-base laminate that can be hot-punched to intricate shapes. Has excellent electrical and physical properties, is stable under moisture and heat.

T-800 Has unmatched electrical properties, yet punches with ease. It has a sensational ability to retain these properties in high humidity.

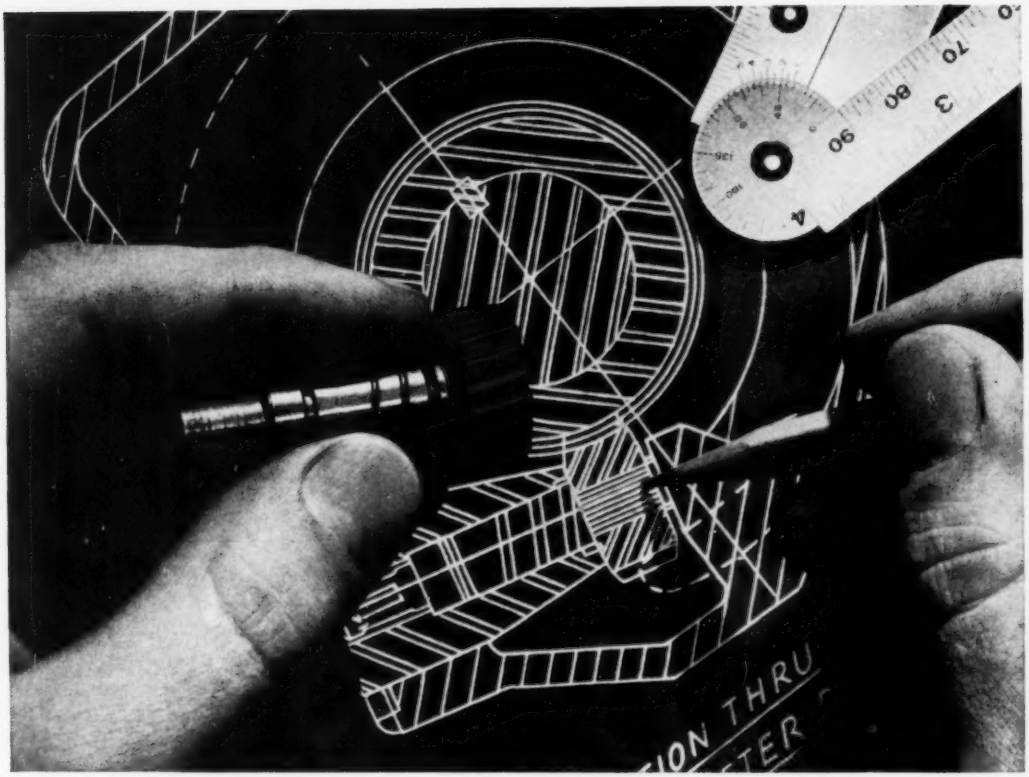
T-812 A further development in the electrical sheet field with insulation resistance on the order of T-800 and mechanical properties comparable to T-725.

The RICHARDSON COMPANY

FOUNDED IN 1858

2789 Lake St., Melrose Park, Illinois (Chicago District)

SALES OFFICES: CLEVELAND • DETROIT
INDIANAPOLIS • LOCKLAND, OHIO • MILWAUKEE
NEW BRUNSWICK, (N. J.) • NEW YORK • PHILADELPHIA
ROCHESTER • ST. LOUIS



NYLON SPEEDOMETER GEAR ON '50 FORD REGISTERS 50% CUT IN PRODUCTION COSTS

Injection-molded to exacting tolerances in a single operation

Nylon door-lock wedge on 1950 Ford. Provides superior abrasion-resistance, high resistance to repeated impact of door slamming. Costs less than materials previously used. (Nylon part molded by Standard Products Co., St. Clair, Mich.)

A five-step operation was formerly required to produce this gear to drive the Ford speedometer cable. Now, in a single operation, Ford injection-molds nylon gears, complete with tooth identification, directly on the shaft. It is estimated that use of Du Pont nylon has reduced the man-hours needed to produce this gear to one-half the former figure—a 50% saving in over-all production cost!

Nylon gears perform better, too. Ford finds that closer tolerances can be held more economically. Tolerances for the nylon gear are ±0.001″ for pitch diameter, and ± 0.002″ for O.D. Too, nylon has superior wear- and abrasion-resistance. Rugged tests equivalent to 100,000 miles of operation at 80 m.p.h. proved nylon's ability to stand up without visible wear.

Nylon's outstanding advantages are saving money and improving performance in a wide variety of industrial and commercial applications. Its properties may well help you, too. For free literature on nylon and other Du Pont plastics, write today. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Plastics Sales Offices: 350 Fifth Avenue, New York 1, N. Y.; 7 S. Dearborn Street, Chicago 3, Ill.; 845 E. 60th Street, Los Angeles, Calif.

DU PONT

PLASTICS

Better things for Better Living

. . . through Chemistry

PLASTICS

OUR TWENTIETH CENTURY JACK-OF-ALL-TRADES!

They are with you from morning to night—smoothing your way. They improve on Nature at every turn, which is by no means any criticism of Mother Nature. She never planned a tree to be a harmonica, or a silk worm to make a stocking.

The plastics which are our business to mold for you were definitely planned for their modern applications. Like modern medicine, however, they should be taken under prescription of a competent consultant, someone who has been through the mill for a long enough time to have become thoroughly familiar with their weaknesses as well as their strengths.

That is why we, as custom molders, exist and are busy. We have a long list of well-known business concerns who prefer that we take the beating that inevitably comes to a plastic molder, who use us as their molding department, and who not only like the arrangement but are making money under it. Most certainly we make money working that way. You can't be in business thirty years and lose money consistently.

For custom molding of almost all kinds of Plastics by almost all methods, write or telephone us. People have been doing just this since 1921.

GEORGE SCRIBNER, President

BOONTON MOLDING COMPANY

BOONTON, N. J. **BOONTON 8-2020**

Pearl Colors in LUMARITH* ACETATE

FOR THAT *"Expensive Look"*

AND COMPETITIVE PRICE

Sparkling translucence you'd expect to find only in the premium price plastics . . . a rainbow of delicate or bold colors to choose from . . . and a price that means material savings.

You get all these in the new Lumarith line of pearl colors—plus the toughness, moldability and economy of acetate.

If you haven't seen Lumarith pearl colors, call your Celanese representative at once. He can show you how this beautiful Lumarith formulation can transform your production cost figures.

Celanese Corporation of America, Plastics Division, Dept. 1-G, 180 Madison Avenue, New York 16, N. Y. In Canada, Canadian Cellulose Products Limited, Montreal and Toronto.

Celanese*

*Reg. U. S. Pat. Off.

PLASTICS

The NEW way to BETTER LABELING by CHICAGO SHOW PRINTING COMPANY

This MYSTIK Label identifies and sells, and gives important instructions to the consumer. It's beautifully printed in three colors and acetate laminated, for a striking, rich-looking label.

vibro BURGESS sprayer

This is the permanent trade mark label on the popular Burgess Vibra Sprayer. Printed in sparkling colors and laminated. Self-Stik MYSTIK means fast production-line application and lifetime beauty.

THERMOS VACUUM WARE

Quality products deserve the quality label . . . MYSTIK. This rich-looking label is easily applied to THERMOS Vacuum Ware, it really stays put, but can be removed as needed.

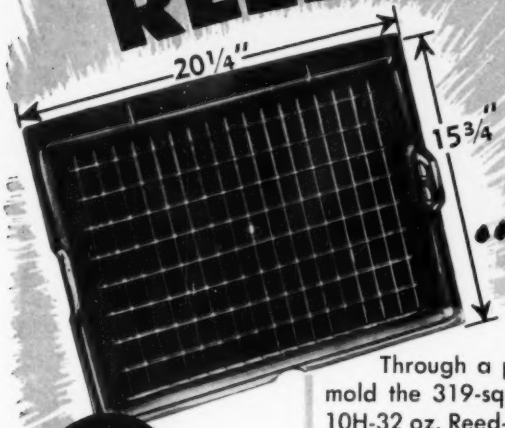
This MYSTIK Self-Stik Label does a three-way job at the point-of-sale . . . it informs, it sells, it identifies. Because it's a MYSTIK Label, it goes on fast and stays put . . . won't curl or fall off.

Let us suggest a MYSTIK Label for your product—for identification, for point-of-sale selling or instructions. Self-Stik MYSTIK LABELS speed hand labeling, solve your hard-to-label problems. They stay put, but if necessary are removable without a trace. They can be printed beautifully in colors, embossed, die-cut to all shapes and sizes. Write for samples and free booklet.

Mystik *Self-Stik* **LABELS**

CHICAGO SHOW PRINTING COMPANY • 2669 NORTH KILDARE • CHICAGO 39, ILLINOIS • OFFICES IN PRINCIPAL CITIES IN NEW YORK 1775 BROADWAY

REED-PRENTICE GIVES YOU CAPACITY.... ...with Interest



319 SQ. IN.

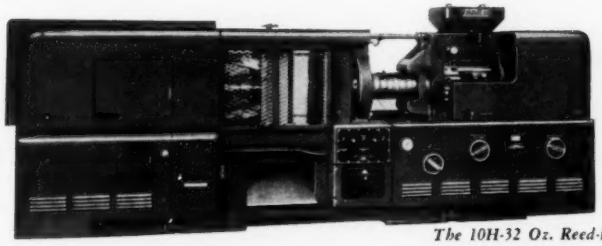
Through a pin-point nozzle, 26 ounces of styrene flow to mold the 319-square inch refrigerator tray pictured above. A 10H-32 oz. Reed-Prentice injection machine, conservatively rated at 210 square inches of casting area, produces this large plastic tray without blemish or flash.

Achieving such exceptional performance, it's no wonder that the General Machine and Tool Works of Walled Lake, Michigan, operate Reed-Prentice molding machines exclusively. They run a battery of six "Reeds" and acclaim them for their practical working features which enable Reed-Prentice to dominate the injection molding machinery field.

An inquiry to Dept. "D" will bring you a copy of our new booklet — "Outstanding Molding Achievements" which clearly shows the unusual capabilities of Reed-Prentice injection machines.

10H-32 OZ. SPECIFICATIONS

Die locking pressure, tons	600
Rated casting area, sq. in.	210
Mold opens	16"
Max. die space	20"
Size of die plates (HxV)	42"x30"
Weight, net	31,500 lbs.



The 10H-32 Oz. Reed-Prentice injection molding machine.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

REPRESENTATIVES:

Detroit	Kordenbrock Machinery Co.
Grand Rapids	Joseph Monahan Co.
Syracuse	J. F. Owens Machinery Co.
Houston	Preston Machine Tool Sales Co.
Seattle & Spokane	Star Machinery Co.
Minneapolis	Chas. W. Stone Co.
Portland, Ore.	Star Machinery Co.

REED-PRENTICE CORP.
INJECTION MACHINES
WORCESTER MASS., U.S.A.

MAIN OFFICE:
Worcester 4, Massachusetts

BRANCH OFFICES:
New York 6, N. Y.
Cleveland 13, Ohio
Chicago 12, Illinois
Los Angeles 58, Calif.

PVA FOR LOW PRESSURE AND CONTINUOUS LAMINATING

The specialization of Reynolds Plastics Division in tough, fine-mil cast film makes available films particularly suited to low pressure and continuous laminating—water-soluble Polyvinyl Alcohol.

Many laminators are turning to Reynolon 4101 (1 mil) because of its extremely high yield per pound. However, where greater strength or re-use through regeneration is required, the heavier gauges (1½, 2, 3 and 4-mil) are frequently used.

Reynolds development of this film stems from its long experience in laminating packaging materials utilizing Aluminum Foil, of which the company is the world's largest producer. Reynolds also produces a general vinyl series—Reynolon 5000. Write for details.

REYNOLON 4000 SERIES—POLYVINYL ALCOHOL

Forms available	Rolls and sheets (1)
Refractive index	1.49-1.53 (2)
Thickness range, in.	0.001"-0.004" (1)
Maximum width, in.	40" (1)
Area factor, sq. in./lb.	10,000 (.002") (2)
Specific gravity—approx.	1.21-1.31 (2)
Tensile strength, lb./sq. in.	7800-8000 (1)
Elongation %	185-253 (1)
Tearing strength (Elmendorf) gms.	High (1)
Water absorption, % (24 hrs., ⅛")	30 up (2)
Resistance to acids	Swells or dissolves (2)
Resistance to alkalis	Swells or dissolves (2)
Resistance to greases and oils	Excellent (2)
Resistance to organic solvents	Unaffected, extremely resistant (2)
Resistance to sunlight	Excellent (2)
Thermal expansion, 10^5 per °C	7-12 (2)
Resistance to storage	Good* (2)
Flammability—in./sec.	2.0 (1)
Taste	None (2)
Toxicity	None (2)
Odor	None (2)
Heat sealing temp. °F	Below 310 (5 sec. contact)

*(*Affected by high Relative Humidity)*
(1) Reynolds data.
(2) Data from printed outside sources.

REYNOLDS METALS COMPANY
PLASTICS DIVISION
19 EAST 47TH STREET, NEW YORK 17, N. Y.

TOUGH "TAP-AND-DIE" CASE SOLVED!

Prolon Plastic engineers and Ace Tool experts of HENRY L. HANSON CO., of Worcester, Mass., worked together to design this low-cost, functional plastic box for tap-and-die tools. Our ace in the hole was Polyethylene. Its soft surface protects finely machined tools, yet case is strong enough to drop on floor without breaking... Have you a problem we can help solve?

39 Ace tools fit into plastic case 5 lbs. lighter, 50% smaller, many, many times more durable and economical than wood.

Have you a problem we can help solve?

PROLON PLASTICS

COMPLETE CUSTOM MOLDING SERVICE

Research • Design • Engineering • Die Making

COMPRESSION AND INJECTION

A Division of Pro-phy-lac-tic Brush Company, Florence, Mass.

A COMPLETE LINE OF PLASTICS MOLDING MACHINERY

From 2... to 200 oz.

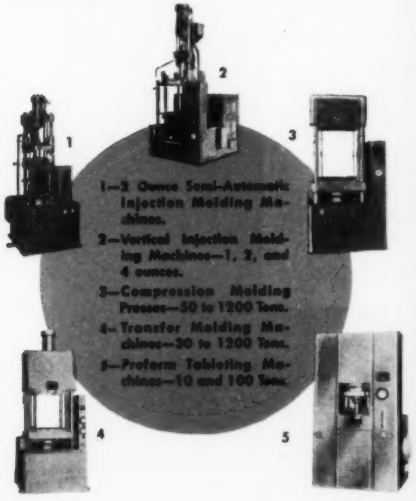
...and, all are obtainable from one source of supply—Watson-Stillman.

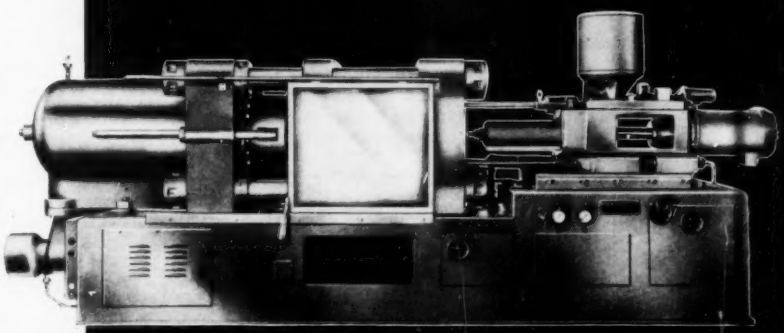
Since the very inception of the industry over 50 years ago, Watson-Stillman engineering ingenuity has paced the industry, year after year, with outstanding plastics molding machinery advancements.

Today, from the W-S "COMPLETELINE" of Injection, Transfer and Compression Molding Machines, you can select a model to fit every production requirement—large and small.

And, W-S offers many additional services. Mold designs, material selection, operation, maintenance, plant layout, are all subjects about which W-S is in a particularly good position to give advice to its clients as a part of its "COMPLETELINE" service.

When planning plant extension or a new business, consult W-S *first* about plastics machinery and how to use it.





Horizontal Injection Molding Machines—8 to 120 Ounces

WATSON-STILLMAN

ESTABLISHED 1848 *HYDRAULIC MACHINERY DIVISION*

Factory and Main Office, ROSELLE, NEW JERSEY

Branch Office, CHICAGO, ILL.

Manufactured in Canada by CANADIAN VICKERS, Ltd., MONTREAL

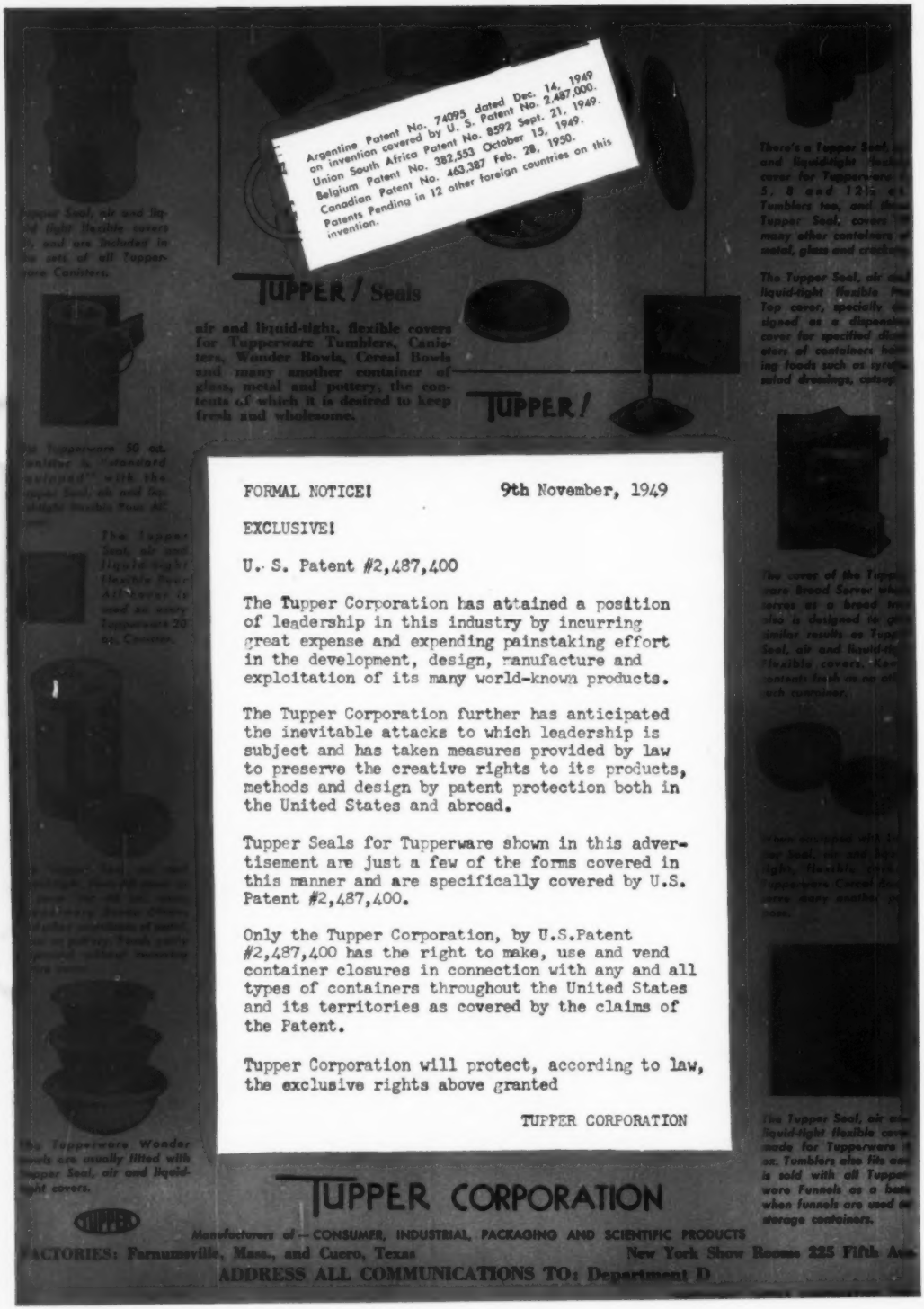
REPRESENTATIVES

Birmingham 3, Ala.	George M. Meriwether	Portland, Ore.	Machinery & Tool Supply Co.
Denver 2, Colo.	Overgard Machine Tool Co.	Rochester 12, N. Y.	Watson-Stillman Co.
Indianapolis 20, Ind.	W. K. Millholland Machinery Co.	San Francisco 7, Calif.	Schellenbach Mach. Tool Co.
		St. Paul 4, Minn.	Anderson Machine Tool Co.
Los Angeles 11, Calif.	H. M. Royal, Inc.	Seattle, Wash.	Machinery & Tool Supply Co.
Pittsburgh 19, Pa.	Stanley Berg & Co.	Spokane 8, Wash.	Mach. & Tool Supply Co.

Foreign Sales Representatives: OMNI PRODUCTS CORP.
460 Fourth Avenue, New York 16, N. Y.
Correspondents Throughout the World

9-K-13A

MANUFACTURERS OF THE MOST COMPLETE LINE OF HYDRAULIC MACHINERY


Argentine Patent No. 74095 dated Dec. 14, 1949
on invention covered by U. S. Patent No. 2,487,000.
Union South Africa Patent No. 8592 Sept. 21, 1949.
Belgium Patent No. 382,553 October 15, 1949.
Canadian Patent No. 463,387 Feb. 28, 1950.
Patents Pending in 12 other foreign countries on this invention.
TUPPER / Seals
air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.
TUPPER!
FORMAL NOTICE! 9th November, 1949
EXCLUSIVE!
U. S. Patent #2,487,400
The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.
The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.
Tupper Seals for Tupperware shown in this advertisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.
Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.
Tupper Corporation will protect, according to law, the exclusive rights above granted
TUPPER CORPORATION
TUPPER CORPORATION
Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS
FACTORIES: Farmumeville, Mass., and Cuero, Texas
New York Show Rooms 225 Fifth Ave.
ADDRESS ALL COMMUNICATIONS TO: Department D

Want a come-on . . . or a follow-through?

Do you go for a fast pitch—or do you want performance? It all depends on what you want for your money.

There are some plastics moulders who'll ignore their costs because you're a good guy (and they're hungry). Some will take shortcuts in mould-making—or grab your job as a fill-in for any price they can get.

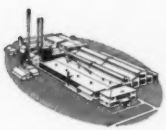
Put your job in this kind of shop, and what have you got? A temporary price advantage on one or two runs, yes, maybe. **But have you got a creative, dependable, permanent supplier?** One who'll deliver longe-range economies by producing good moulds for more efficient production? One who'll improve your product designwise? One who'll meet your shipping schedules year after year from the same soundly-engineered mould?

Temporary price-shaving just plain isn't worth what it can cost. Careful plastics buyers must watch costs, we know. **We say, "Ask for bids on your jobs. That's good business. But insist that all your bidders know their costs—that they are all completely equipped to handle your job from design to final finish—that they've all earned a name for knowing plastics!"**

There are a lot of moulders like this. We're one of them. And we'd like to talk plastics with you. We'll answer your inquiries promptly.

Kurz-Kasch

FOR OVER 34 YEARS PLANNERS AND MOULDERS IN PLASTICS



Kurz-Kasch, Incorporated • 1415 South Broadway • Dayton 1, Ohio

BRANCH SALES OFFICES: New York, *Lexington 2-6677* • Chicago, *Harrison 7-5473* • Detroit, *Trinity 3-7050* • Philadelphia, *Granite 2-7484* • Dallas, *Lakeside 1022* • Los Angeles, *Prospect 7503* • St. Louis, *Delmar 9577* • Toronto, *Adelaide 1377.*

EXPORT OFFICE: 89 Broad Street, New York City, *Bowling Green 9-7751.*

FOR HYDRAULIC PRESSES

See Bethlehem

A complete service that includes planning, engineering, building, equipping, assembly

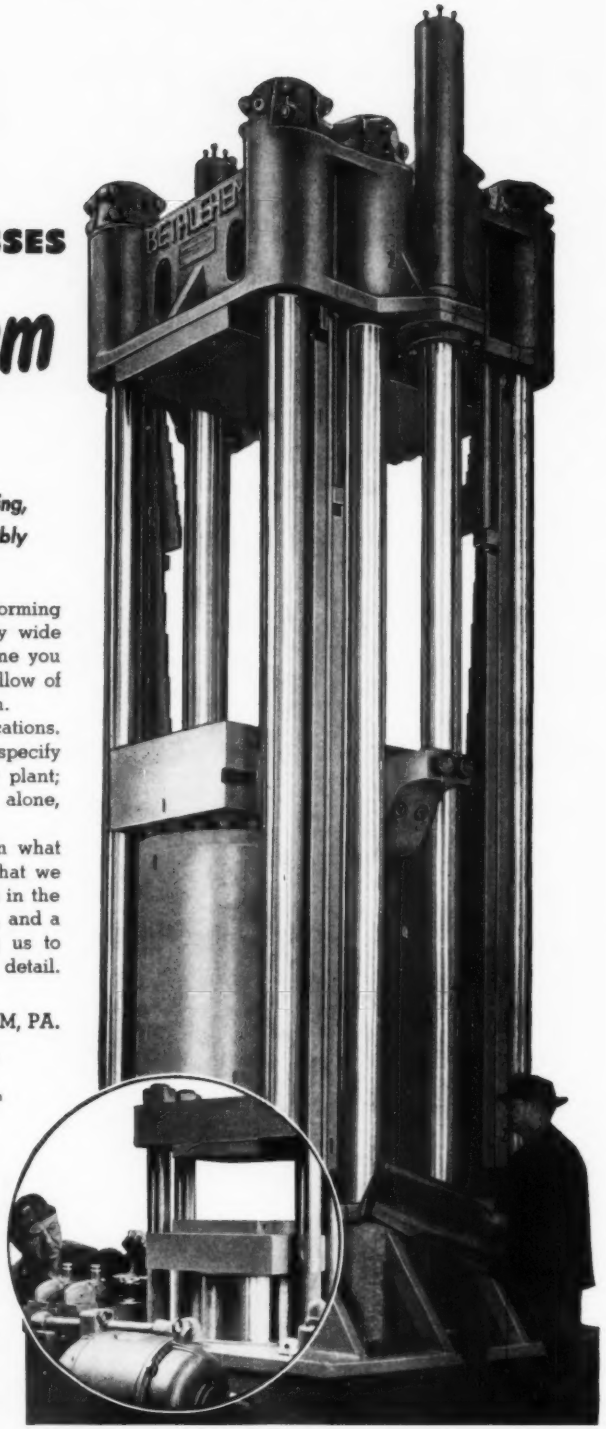
Bethlehem hot-plate, molding, and metal-forming presses are made to order in an unusually wide range of sizes. In our shops at the same time you may find a small 110-ton unit and a big fellow of 5,000-ton capacity—or any size in between.

Presses are built to customer specifications. When you order from Bethlehem, you may specify self-contained or separate hydraulic power plant; or, if you like, we can furnish the press alone, without power plant or accessories.

Before placing future orders, check on what Bethlehem has to offer. Let us show you what we have built for others during our many years in the business. We have the engineers, the plant, and a background of deep experience, enabling us to build the unit you specify, correct in every detail.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



★ BETHLEHEM STEEL ★

BETHLEHEM
Custom-Built
HYDRAULIC PRESSES

FOR PLASTICS . . . METAL-FORMING . . . WALLBOARD . . . FIBER BOARD . . . VULCANIZING

NOW - *to help you make better vinyl and rubber products —*

2 NEW G-E PLASTICIZERS

Now you have a choice of two General Electric plasticizers to help you improve your compounds and lacquers: G-E 2557 and G-E 2559. Both are polyester-type designed for plasticizing vinyl and rubber compounds, and nitrocellulose and other lacquers. They are suitable for use in sheetings, coatings and extrusions; for fabrics, upholstery, weltings, electrical insulation and for many other similar products.

BOTH PLASTICIZERS HAVE OUTSTANDING

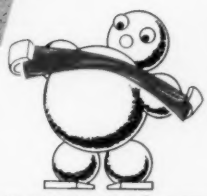
- light stability
- heat resistance
- extrudability
- weather resistance
- pigment wetting ability

G-E 2557 HAS

- high plasticizing efficiency
- low viscosity
- light color
- excellent low-temperature flexibility

G-E 2559 HAS

- low migratibility
- good oil and water resistance
- lower cost than G-E 2557



Either of these two G-E plasticizers may be the means of helping you make a better product more quickly and economically. Find out which one is best for *your* purposes by writing us at Section C3, Chemical Department, General Electric Company, Pittsfield, Massachusetts. Or use the coupon for full technical information.

You can put your confidence in

GENERAL ELECTRIC

CD50-C2

SEND FOR MORE DETAILS!

Section C3, Chemical Department
General Electric Company
Pittsfield, Massachusetts

Please send me technical information on the new G-E plasticizers ☐ G-E 2557 ☐ G-E 2559

Name_____

Business_____

Address_____

City_____ Zone_____ State_____

PLASTICS MACHINERY BULLETIN

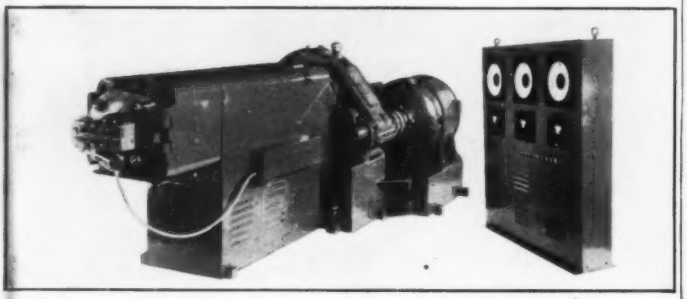
Reporting News and Machine Design Developments

IN BUSINESS TO **NRM** REDUCE YOUR COSTS

6″ ELECTRICALLY HEATED EXTRUDER ACCLAIMED IDEAL FOR PELLETIZING; ALL OTHER PROCESSES

Torpedo-type Screw and Balanced Heat Control: Two Exclusive Features Give More Uniform Extrusions at Lower Costs

The NRM 6″ all-electrically heated extruder is an all-round "work-horse" of the plastics extruding industry. NRM's 6″ extruder has proved ideal, *on-the-job*, for every kind of standard extrusion process, pelletizing, wire and cable covering, etc.



NRM 6″ electrically heated extruder and control panel. Nominal capacity: 400-500 lbs. per hour. Screw speeds: 8 to 64 rpm. Temperature range: 750° F. 75 hp variable speed drive.

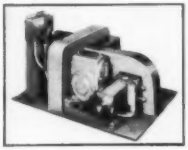
One of the main reasons for NRM's overwhelming superiority is the fact that NRM pioneered plastics extruders are built *solely* for thermoplastics extrusion. Because of this, NRM has developed features such as the exclusive *Torpedo-type Screw* and *Balanced Heat Control*.

The Torpedo-type Screw makes possible maximum production and uniform extrusions with close tolerances when working with rigid compounds such as cellulose acetate, ethyl cellulose, polystyrene . . . and often with elastomeric compounds such as polyethylene.

Balanced Heat Control gives you *absolute control over frictional heat with no compressed air, no pipes, no oil or water cooling* at a temperature range up to 750° F.

Find out now how NRM equipment can save you money and improve production quality. Write for complete details to Plastics Division, National Rubber Machinery Company, Akron 8, Ohio.

1″ Bench Model Extruder suited both for Lab. Work and Regular Production

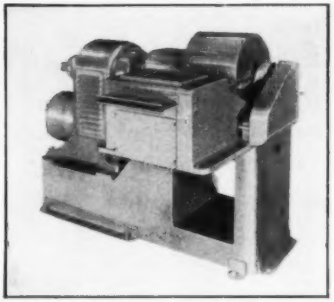


NRM's 1″ Bench Model is available both electrically and steam heated. With a nominal capacity of 6-10 lbs. per hour, the Bench Model is *tops* for either laboratory work or small capacity regular production or both. The Bench Model has as an accessory a combination tubing die and wire covering crosshead enabling, for example, experimental work to be done with special materials or small production processes to be carried out.

From Serrated Strips or Multiple Strands — Up to 1,500 lbs. of Pellets per Hour!

NRM Choppers are complete units for chopping pre-formed serrated plastic strips or multiple strands of rigid materials into uniform pellets. Nominal capacity is 500 lbs. per hour (Model "500") and 1,000 lbs. per hour (Model "1000"). However, under certain conditions on some installations, production of 1,500 lbs. has been obtained with slight modifications of design.

All NRM Choppers models have forged steel rotors. The four flying Knives and 1 bed Knife of "battle-axe" grade steel are easily adjustable and are replaceable. Drives for the Model "1000" is 10 hp U. S. Varidrive, for Model "500", 5 hp.



NRM Choppers have welded steel housings with hinged covers for accessibility to the rotor. "Fines" may be removed through a chute which has an easily accessible and replaceable vibrating screen.

NRM chopping machines team perfectly with other NRM equipment in a pelletizing "line-up". Many typical installations include the famous NRM 6″ extruder with the die, the NRM Universal Take-off Conveyor, a water cooling trough and an NRM Chopper for high quantity production of uniform pellets.

For complete details or specifications on any of this equipment, write to NRM at Akron, Ohio.

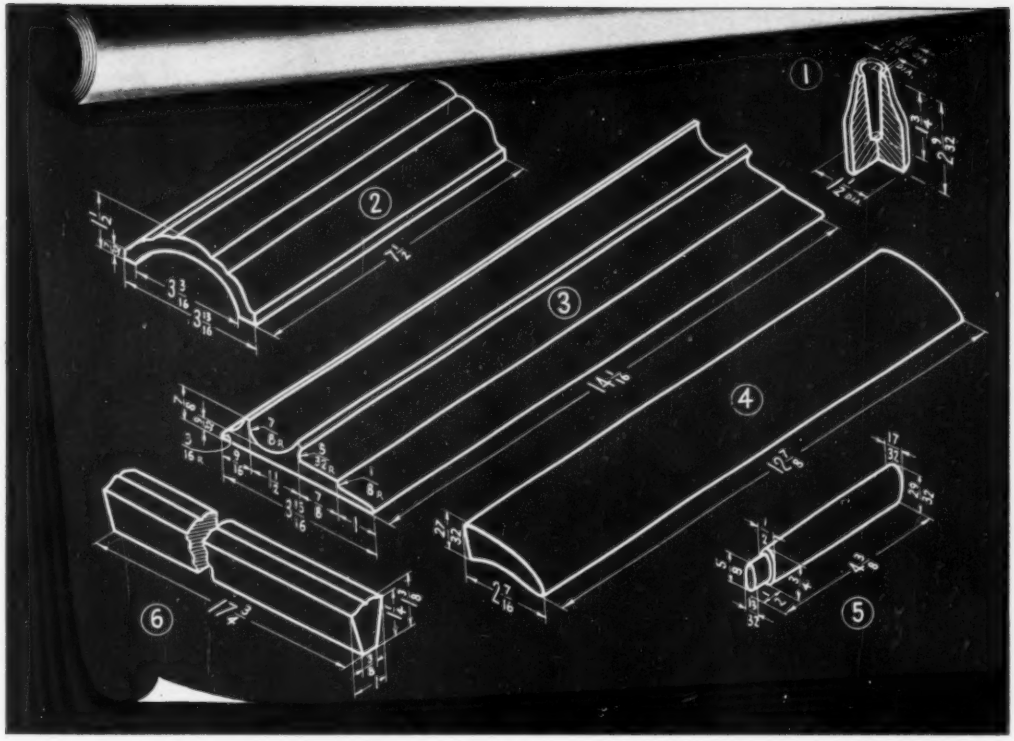
ONLY NRM equipment includes sizes ranging from the 1″ Bench Model to the huge 12″ NRM extruders for special applications. All available for electrical, oil or steam heat.

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories
Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
EXPORT Plastics Machinery: OMNI EXPORT CORPORATION
460 4th Ave., New York 16, N. Y.

Creative Engineering



Blueprints of a Thousand Successes

Enterprises, great and small throughout America, have found no finer plastic than Marblette cast phenolic resins.

In color, this outstanding plastic offers every tint and tone of the rainbow. It recaptures the depth and luminosity of precious jewels, or tortoise shell and rare ivory. Or it may be had transparent, translucent, mottled, opaque, or clear as crystal.

You get far more than a fine cast phenolic resin from Marblette. You can have without the slightest obligation the broad experience of Marblette's Engineering Staff to serve you in your special problems and possible adaptations of Marblette; they can specify procedures and methods for short runs, and show you how little it costs to tool up for this economical cast phenolic resin.

Marblette Engineering Staff service goes beyond detailing the ease with which Marblette can be machined, its resistance to oils and acids, its non-inflammability. They can outline for you the broad variety of ways Marblette will use its resources to insure your success.

FREE — Write on your letterhead for blueprints of Marblette stock forms — those illustrated and others.

Cast Phenolic Resins

In addition to the great number of stock forms — sheets, rods, tubes—in which Marblette is supplied, an endless variety of castings are available, such as:

Cutlery, carver, kitchen utensil handles
Drawer poles and knobs
Cigarette, cigar, and pipe stems
Brush backs
Cosmetic bottle tops
Television indoor aerial bases
Novelty toy shapes

Any other shape can be made to your specifications provided draft is all one way.

MARBLETTE

37-21 Thirtieth Street • Long Island City, N. Y. • ST 4-8100
CHICAGO • LOS ANGELES • TORONTO • HAVANA


NEW PROPERTIES FOR
YOUR PLASTIC LAMINATES
when you use Glass Cloth woven from
Vitron GLASS YARNS
Reinforce your plastics with industrial fabrics woven from VITRON Glass Yarns and gain these important properties:
TREMENDOUS STRENGTH—more strength for weight than most structural metals. High tensile, flexural, impact and compressive.
MOISTURE RESISTANCE—inorganic glass fibers themselves absorb no moisture; will not swell or shrink.
CORROSION RESISTANCE—glass fibers resist oxidation, mildew, oils and most acids.
HEAT RESISTANCE—Vitron Glass Fibers withstand temperatures of 1000° F; conduct heat away rapidly.
VITRON Glass Yarn fabrics for plastic reinforcing are woven and sold by leading industrial weavers. Our engineering staff is available to you on a moment's notice to help with any reinforcing problem. Write today for complete information.
You'll find VITRON in:
• electrical panel boards
• motor slot sticks
• television parts
• aircraft: radomes, wing tips, hot air ducts, window frames, engine cowlings and other parts
• varnished insulating cloth
• plastic pipe
• moisture-proof coated fabrics
Vitron®
GLASS FIBER
PLASTIC REINFORCING MATERIALS
GLASS FIBERS INC. • WATERVILLE, OHIO
PHONE: WATERVILLE 2201

Plastics for **INDUSTRY**

Pictured above is the lucite nameplate, manufactured by Cruver for the Westinghouse Unitaire air conditioning unit. Actual size is 10-1/4 inches long by 2-3/4 inches wide; decorated by the Cruver Bas-Releef process in bright silver and black.

CRUVER

MANUFACTURING CO.

2460 W. JACKSON BLVD., CHICAGO 12, ILL.

BRANCH OFFICES

DETROIT MINNEAPOLIS NEW YORK

CLEVELAND ST. LOUIS

You can get UNIFORMITY in plastic parts

FROM PLASTIC MOLDERS, INC. (of Chicago)

Certainly we can do YOUR job, with:

- ★ Modern Tool Room
- ★ Compression Presses from 100 tons to 750 tons
- ★ Transfer Presses from 100 tons to 400 tons
- ★ Injection Presses from 8 oz. to 32 oz.
- ★ Fabrication, Assembly and Painting of All Types of Plastics

Representatives in Principal Cities

When You Have Plastic Molding Problems

CALL CHICAGO
PAlisade 5-6750

When plastics play an important role in your production schedule, there's no time for trouble with parts that aren't perfect. You've a right to insist on—and get—complete uniformity throughout your production schedule.

At least, that's the kind of custom molding Plastic Molders Inc., Chicago, has been doing for hundreds of manufacturers... and is ready to do for you.

We're equipped to do every job—large and small—with speed, efficiency and low prices—to keep your production costs in line.

You owe it to yourself to contact Plastic Molders Inc., on that very next job. An inquiry costs you nothing—may save you plenty!

PLASTIC MOLDERS, INC.

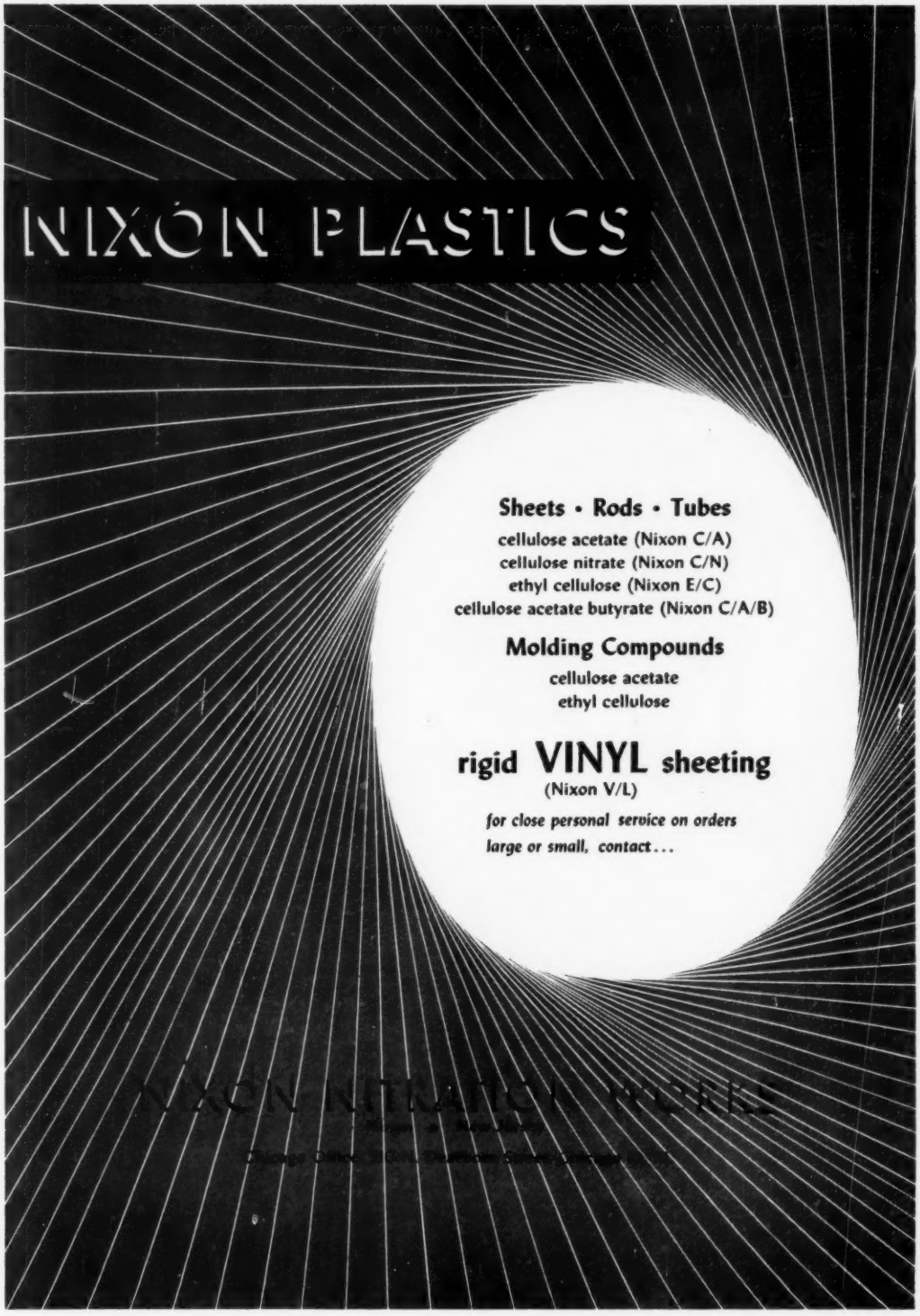
OF CHICAGO

APPROVED MOLDED PRODUCTS

Compression and Injection Molders

MOLDINGS UP TO 25 LBS.

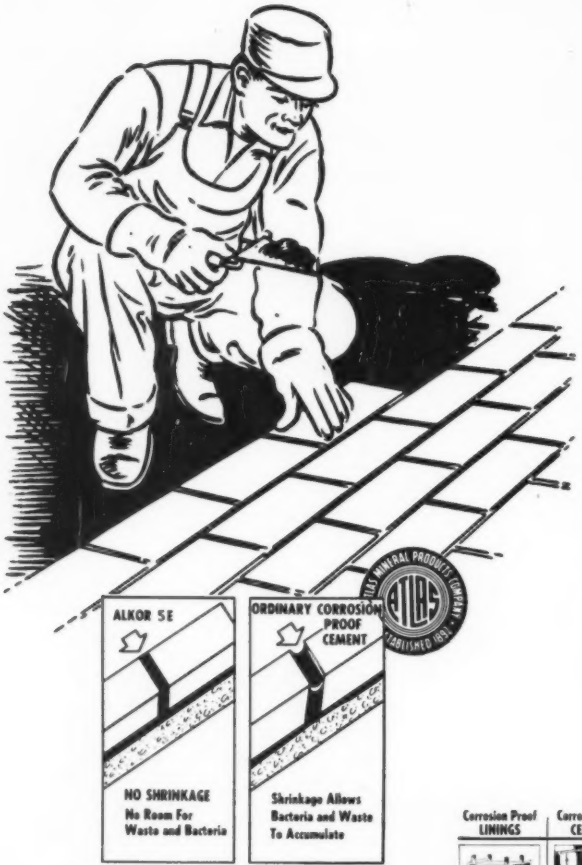
3670 Milwaukee Ave.—Chicago 41, Illinois


NIXON PLASTICS
Sheets • Rods • Tubes
cellulose acetate (Nixon C/A)
cellulose nitrate (Nixon C/N)
ethyl cellulose (Nixon E/C)
cellulose acetate butyrate (Nixon C/A/B)
Molding Compounds
cellulose acetate
ethyl cellulose
rigid VINYL sheeting
(Nixon V/L)
for close personal service on orders
large or small, contact...

GREAT NEWS!
Atlas research announces

ALKOR 5E

the superior acid and alkali proof cement for joining brick and tile



This is the news you have waited for, ALKOR 5E, the nearest thing to a universal corrosion - resistant cement. Check these properties: Inert to all solvents and alkalies; Resistant to all non-oxidizing acids; No appreciable shrinkage on setting; No obnoxious odors; Excellent workability; Easily tooled; Adhesion to wire cut brick greater than 500 psi; Tensile strength 1500 psi; Compressive strength 15,000 psi; Heat accelerates setting only, no fumes or smoke; Sets in less than 24 hrs. at 70°F. For complete information write us at 25 Walnut Street, Mertztown, Penna.

ATLAS HAS PROTECTED INDUSTRY OVER HALF A CENTURY

THE ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNA. HOUSTON, TEXAS

FURFURYL ALCOHOL RESINS

are Prominent in Acid; Alkali; and Solvent-proof Construction

The Atlas Alkor Chemical resistant mortar used here is made from furfuryl alcohol resin.

Atlas Alkor installations are based on corrosion resistant brick and tile, bonded and joined with chemical-proof mortar. This construction solves the floor, wall, and tank corrosion problems for many industries. Such construction will resist (alternately, if necessary) attack by alkalies and acids of all concentrations and all solvents. In addition, such installations are non-absorbent, easy to clean, inert to live steam, grease, oil, chemical spillage and bacterial attack.

Atlas Alkor chemical resistant mortar is a good illustration of the excellent chemical resistance of properly prepared furfuryl alcohol resins, which cure rapidly even in the absence of external heat sources. For further information about Atlas Alkor corrosion-proof construction, contact Atlas Mineral Products Company, 25 Walnut Street, Mertztown, Pennsylvania.

The Quaker Oats Company does not manufacture furfuryl alcohol resins but is glad to furnish information about the alcohol itself, and to consult with you about possible uses for FA involving chemical resistance.

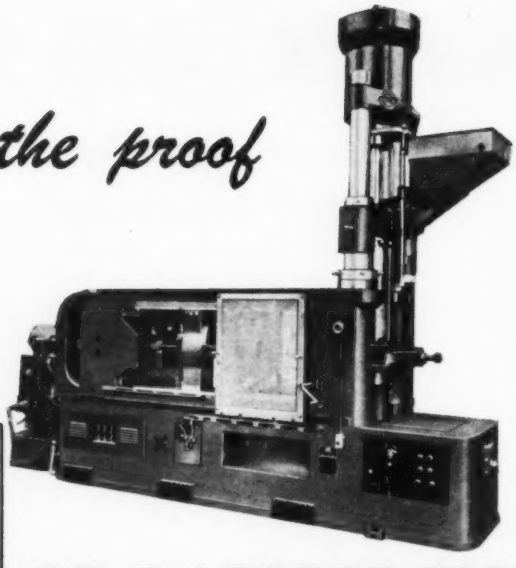
Our New Address is: Merchandise Mart Plaza
Chicago 54, Illinois

The Quaker Oats Company CHEMICALS DEPT.

337D THE MERCHANDISE MART, CHICAGO 54, ILLINOIS
EASTERN SALES OFFICE
1240D WHITEHALL BLDG., NEW YORK 4, N. Y.

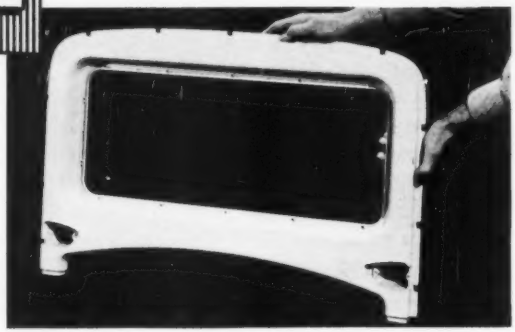
In San Francisco, The Griffin Chemical Company In Australia, Swift & Company, Pty., Ltd., Sydney
In Europe Quaker Oats-Graanproducten N.V., Rotterdam, The Netherlands; Quaker Oaks (France) S.A. 42, Rue Pasquier, Paris 8E, France

Here's the proof



32 OZ ON A LESTER MACHINE IN POLYSTYRENE

Write for your Free Copy of The Lester Press



Lester machines are among the few rated exclusively in polystyrene. That is, a Lester machine will shoot its full rated capacity in polystyrene on a regular cycle—*without changes in feeding method or mechanism!* Thus, a 32 ounce Lester will displace about 40 ounces in acetate.

The shot shown here is a 32½ ounce refrigerator frame molded of white high impact polystyrene by Cambridge Molded Plastics of Cambridge, Ohio, on a 32 ounce Lester. Although the deep wells at the bottom of the piece might have presented a problem, it ran successfully on installation. For that *extra* value in all phases of injection molding, depend on Lester Injection Molding Machines.

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

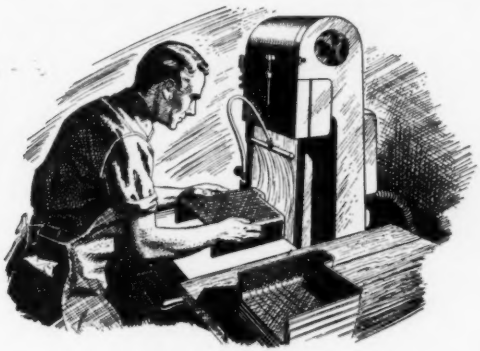
REPRESENTATIVES

New York . . . . . Steven F. Krould
Detroit . . . . . Thoreson-McCosh
Chicago . . . . . J. J. Schmidt
Cleveland . . . . . Don Williams
Cincinnati . . . Index Machinery Corp.
Los Angeles . . Seaboard Machinery Co.
San Francisco . . . . . J. Fraser Rae
St. Louis, Milwaukee . . . A. B. Geers

FOREIGN

Toronto, Canada . Modern Tool Works, Ltd.
London, England . . Dowding & Doll, Ltd.
Calcutta, India . . Francis Klein & Co., Ltd.
Sydney, Australia . . Scott & Holladay, Ltd.
Japan, New York . . W. M. Howitt, Inc.

COATED PRODUCTS COMMENTS



More yield per belt in finishing plastics

Made specifically for the wet sanding of plastics, CARBORUNDUM's waterproof cloth belts produce *more* and *better work* at less cost.

The water-lubricated abrasive action is cool, clean and fast. A high initial cutting rate is maintained constantly throughout the long life of the belt. There is no frictional heat to burn or distort thermo-plastic materials. Pre-buff finishes are obtained in minimum contact time. With 'wet-stretch' retarded, down-time for belt tension adjustment is reduced. Plastic dust is wet down and a cleaner shop results.

These operating benefits result from a combination of product characteristics which include a hard and sharp silicon carbide abrasive, a resin bonding agent and a wear-resistant, pre-sized cloth backing. Your first step in getting these advantages is to call in your CARBORUNDUM representative. Coated Products Division, The Carborundum Company, Niagara Falls, New York.

COATED ABRASIVES BY

CARBORUNDUM

TRADE MARK

Making ALL abrasive products . . .
to give you the proper ONE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

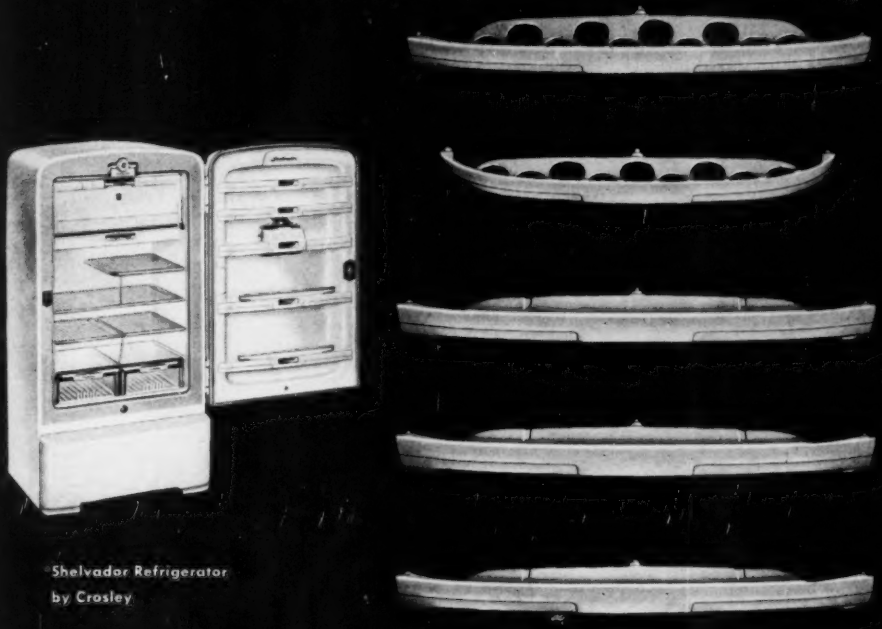
ANOTHER GREAT PRODUCT ACHIEVEMENT BY Columbia

Custom molders of plastic products and special plastic packaging

COLUMBIA PROTEKTOSITE COMPANY, INC., Carlstadt, N. J. • New York Showrooms: Empire State Bldg. • West Coast Office: 380 Bayshore Blvd., San Francisco, Calif.

The Gleaming White Shelves of the Shelvador*

are made from BAKELITE Styrene Plastics



Shelvador Refrigerator
by Crosley

● Lasting whiteness . . . sharp, clean lines . . . low cost—here are three good reasons why Crosley uses BAKELITE Styrene Plastics for the door shelves of its famous "Shelvador" refrigerator.

These versatile, economical materials fit the specification for such applications to a "T". They are resistant to water, caustics, even strong acids. They can be molded on standard equipment to complicated shapes and fine detail. They are dimensionally stable, mechanically strong, light in weight.

BAKELITE Styrene Plastics come in all colors. And whether in lustrous white or any tint or shade . . . whether in transparent, translucent, opaque or crystal-clear form, they give unfading beauty . . . superior performance.

BAKELITE Styrene Plastics have a long history of successful service in such diverse fields as housewares, wall tiles, packaging, closures, toys, and displays. Discover how they can help you better your products—either new, old, or contemplated. Bakelite Division engineers will be glad to provide the technical assistance on your specific application. Write Dept. AJ-13.

Molder: Wolverine Plastics, Inc., Milan, Michigan

Bakelite TRADE-MARK Styrene PLASTICS

UCC

BAKELITE DIVISION, *Union Carbide and Carbon Corporation*, 30 East 42nd St., New York 17, N.Y.

more complete national distribution for

Pliobond

the adhesive that "Bonds Anything to Anything"

Now you can get **Pliobond** — the adhesive that "bonds anything to anything" — from a distributor located conveniently near you. That means *quicker service* in answering your bonding problems. You can get technical assistance *locally*—get just the amount of **Pliobond** you need in small or large containers.

Pliobond is a tan-colored, cold-setting thermoplastic liquid that dries rapidly to a waterproof, chemically resistant bond with a very high strength and permanent flexibility. Easily applied by brushing, spraying, spreading or rolling — bonds hot (dry), by reactivation, or cold (wet). **Pliobond** will bond practically any solids — permanently.

For full details, see your distributor, or write:

Goodyear, Chemical Division
Akron 16, Ohio

1
ACORN ADHESIVES & SUPPLY CO.
1011 W. 11th Street
Los Angeles 15, Calif.

2
BOND ADHESIVES CO.
255 Wallabout Street
Brooklyn, N. Y.

3
CAMPBELL INDUSTRIES
643 W. 73rd St.
Chicago 2, Ill.

4
CORN BELT ADHESIVES
815 22nd Ave.
Council Bluffs, Ia.

5
HAYES ADHESIVES CO.
4159 Union Blvd.
St. Louis, Mo.

6
KERMAN INDUSTRIES
8415 9th Ave., S.W.
Seattle 6, Wash.

7
W. J. RUSCOE CO.
2170 W. Market St.
Akron 13, Ohio

8
C. H. STUMP
274 Brannan St.
San Francisco, Calif.

9
UNITED FINISH CO.
Corwin St.
Peabody, Mass.

10
WILSOLITE CORP.
501 Amherst St.
Buffalo, N. Y.

USE PROVED *Products*

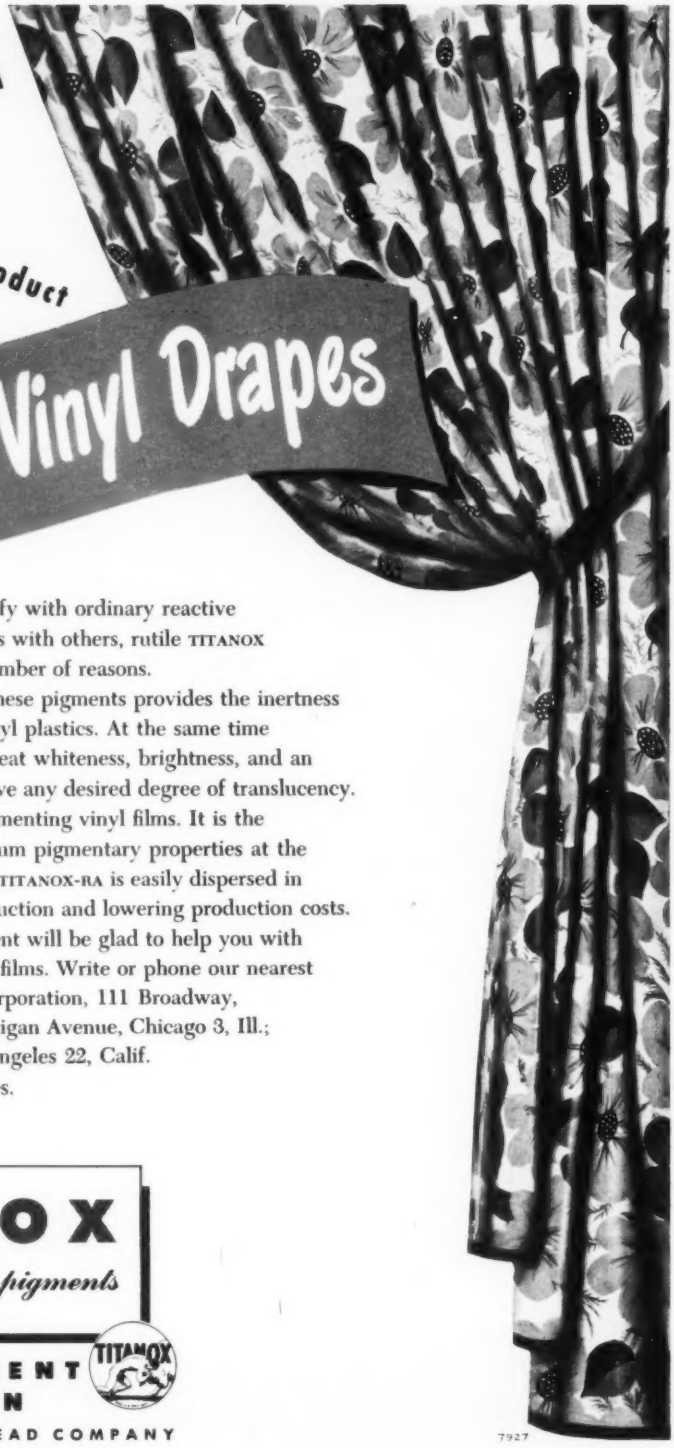
GOODYEAR

Pliobond—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

TITANOX-RA

helps evolve a new product

Printed Vinyl Drapes



• Vinyl plastics are tough to opacify with ordinary reactive pigments. Yet with these plastics, as with others, rutile TITANOX pigments prove to be ideal for a number of reasons.

The great chemical stability of these pigments provides the inertness required for compatability with vinyl plastics. At the same time rutile TITANOX pigments provide great whiteness, brightness, and an opacity that can be controlled to give any desired degree of translucency.

TITANOX-RA is first choice for pigmenting vinyl films. It is the most efficient, affording the maximum pigmentary properties at the lowest pigment volume. Moreover, TITANOX-RA is easily dispersed in vinyl polymers, thus speeding production and lowering production costs.

Our Technical Service Department will be glad to help you with your problems in pigmenting vinyl films. Write or phone our nearest office today. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y., 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

7927

Skillful Molding

MEANS TUNEFUL PERFORMANCE

Cobra Tone Arm, molded for Zenith Radio Corp. Chicago

Yes, skillfully molded plastic parts do help the flow of beautiful melody in any music reproducing instrument. A striking example is this Cobra Tone Arm which we molded for the Zenith Radio Corporation. We were commissioned to mold a piece that would help to serve in bringing new vibrance and tonal color to phonograph record performance. From the careful selection of the *most suitable* plastic material through the precision molding, we had music on our minds. The amazing musical success of the Cobra Tone Arm proved we worked in the right key. We can work equally well in tune with your production aims. Let our engineers help you today.

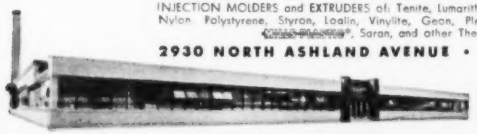
ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, Ethocel, Nylasticon*, Saran, and other Thermoplastic Materials

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or for detailed information about Nylasticon, piping, tubing and fittings, write for circulars containing data and illustrations.*

**Trademark Registered*



The fault was in choosing the wrong type fastener . . . but

THE MOLDER WAS BLAMED

When "tough breaks" like this occur —and they happen too often in assembly with plastics parts—it's the custom molder, usually, who gets the blame. Yet, all too often, the fault lies *not* with the molding compound but with the fasteners used by the manufacturer.

Use of the wrong *type* of fastener may not only damage the molder's reputation unfairly . . . it can *wipe out* your profits, through parts spoilage and increased production costs. That's why so many good custom molders, interested in their customers' problems, get recommendations first from Parker-Kalon.

First, because Parker-Kalon makes a complete line of Self-tapping Screws —will fit the fastener to your special needs, *not* your needs to the fastener.

Second, because Parker-Kalon, originators of Self-tapping Screws, learned long ago how to keep hardness and toughness properly balanced in *every* screw—learned to maintain the uniform quality that keeps fast-moving assembly lines trouble-free. And there's no substitute for 35 years experience.

So question the efficiency of your fastening method before you blame your molder. Call in a P-K Assembly Engineer —preferably at the design stage. It will pay you—in fewer rejects, faster assembly, and help your molder serve you better. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y. Sold everywhere through accredited Distributors.

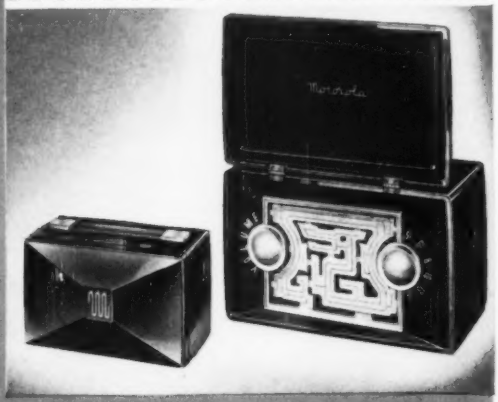
*TRADE MARKS REG. U.S. PAT. OFF.

P-K TRADE MARK

The Original

PARKER-KALON* SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY



New RCA and MOTOROLA Portables Reflect SANTAY Molding Skill!

SLEEK new beauty distinguishes these new RCA and Motorola portables. Their cabinets are brilliant examples of modern thermoplastic molding as produced by SANTAY. All operations, including engineering, tooling, injection molding, finishing and assembly work were performed speedily, efficiently, and economically in our own plant. SANTAY craftsmen, with a background of over 30 years experience in plastics, have met or exceeded the specifications established for these exacting jobs! ★ If a fine thermoplastic part or product is an important consideration in *your* business, by all means discuss your needs with a SANTAY Engineer. Whether a simple plastic part, or the most intricate combination metal and thermoplastic molding is required, you can depend upon SANTAY to produce it *better* and at moderate cost! Just call in our nearest representative or write us. You'll get the kind of service and cooperation you need.

Santay

SYMBOL OF PRECISION WORKMANSHIP

SANTAY CORPORATION

355 NORTH CRAWFORD AVENUE, CHICAGO 24, ILLINOIS

REPRESENTATIVES: QUEISSER BROS., 110 E. 9th ST., INDIANAPOLIS 2, INDIANA • STANLEY J. ROBERTS & E. H. VANNORWICK, 5-259 GENERAL MOTORS BLDG., DETROIT 2, MICHIGAN • C. E. WHITE & CO., BULKLEY BLDG., CLEVELAND 15, OHIO • WILLIAM S. RICHARDS COMPANY, No. 2 S. BRENTWOOD BLVD., CLAYTON, ST. LOUIS 5, MISSOURI • E. J. EDMUNDS, 5344 IRVING ST., PHILADELPHIA 39, PENN.

INJECTION MOLDING • METAL STAMPING • ELECTRO-MECHANICAL ASSEMBLIES

informative labeling in action...

THEY'RE UNBREAKABLE! And the customer is told so by the *Kum-Kleen Label on the product.*

THEY'RE BOILABLE! And again the customer is told so by the *Kum-Kleen Label on the product.*

A SALE IS MADE because the customer is told the facts by the *Kum-Kleen Label on the product.*

HERE IS AN EXCELLENT EXAMPLE of informative labeling on-the-counter salesmanship *in action*... from Plastics Manufacturing Corp. of Los Angeles. With Mrs. America as its sales target, Plastics Manufacturing tells her their line of plastic ware is both boilable and unbreakable. Here is why they selected *Kum-Kleen*, the labels that are applied with production-line speed at a fraction of the on-the-product cost of ordinary labels. They stick and stay stuck to all plastics without heat or moistening . . . yet are removable without harmful scraping.

Plastics Manufacturing is just one of the many manufacturers who are giving their products the advantages of *Kum-Kleen* informative labeling at remarkably low on-the-product cost.

Write for samples and prices

Kum-Kleen®

AVERY ADHESIVE LABEL CORPORATION

NEW YORK CITY: 41 Park Row
DETROIT: 3049 East Grand Boulevard
CLEVELAND: 2123 East 9th Street
PHILADELPHIA: 1069 Commercial Trust Building
CHICAGO: 608 South Dearborn Street
MONROVIA, California

Representatives In All Principal Cities

Solvent testing shows clearly the difference that annealing makes in a molded product. Cracks and crazes are clearly evident in the unannealed sample at the left. The sample at the right shows the effectiveness of the annealing operation.

Now you can control Crazing and Cracking by annealing your Polystyrene

Get the full story of this process from Koppers Technical Department

INTERNAL stresses and strains that result in crazing and cracking of plastic products can be a major cause of excessive rejects and failures in service. Molders are discovering they can reduce this waste of material, time and labor and produce a better, more lasting job by *annealing* their finished products.

Koppers Technical Service Department has done extensive research on annealing of Koppers Polystyrene and now makes the results of this research available to you in a Technical Service Report. It's another example of Koppers efforts to help manufacturers and molders achieve reduction in costs through use of versatile Polystyrene.

All three types of Koppers Polystyrene are well adapted to various annealing processes. Their heat distortion temperature permits you to employ the proper heat treatment safely. In addition, you can take advantage of the low molding costs, low material costs and improved product appearance by using Koppers Perfected Polystyrene.

Why not get the complete story on annealing? Send for your copy of Technical Service Report No. 2, "Annealing of Polystyrene." A copy of "Koppers 1950 Polystyrenes" is also available for your use. Just mail the coupon.

KOPPERS POLYSTYRENE gives you all these advantages

- **Low cost**
- **Light weight—more pieces per pound**
- **Excellent dimensional stability**
- **Excellent electrical properties**
- **Choice of heat distortion temperature ranges**
- **Good chemical and moisture resistance**
- **Tasteless and odorless**
- **Unlimited color range**

Koppers Company, Inc.
Chemical Division, Dept. MP-70
Pittsburgh 19, Pa.

Please send me the following literature:

☐ "Annealing of Polystyrene"
☐ "Koppers 1950 Polystyrenes"

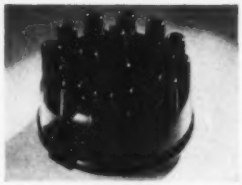
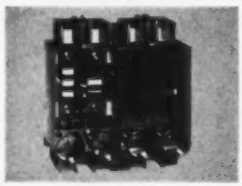
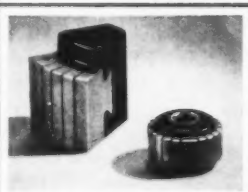
Name .....
Company .....
Address .....
City ..... State .....

Koppers Perfected Plastics

KOPPERS COMPANY, INC.
Chemical Division Pittsburgh 19, Pa.
Regional Offices: New York, Boston, Philadelphia, Chicago, Detroit and Los Angeles

KOPPERS

HOW TO CHOOSE YOUR
ELECTRICAL GRADE
PHENOLIC MOLDING COMPOUND

What do you make?		Properties you need	DURITE recommends
Automotive parts— distributor heads, magneto housing and cover, etc.		High dielectric properties, general durability.	For highest water-resistance: 570 For lower cost: 560 Black or brown
High voltage relay and fuse blocks, also terminal blocks.		High dielectric properties, high heat resistance.	For highest dielectric properties: 570 For highest heat resistance: 572 Black or brown
Instrument housings, switch handles, exposed parts.		Lustrous finish, good general strength and dielectric properties.	For best finish: 525 For higher impact properties: 530 Black or brown
Electric motor parts, molded commutators, etc.		Highest heat resistance, good dielectric properties.	For highest heat and water-resistance: 572 Black or brown
X-Ray equipment housings and other office or clinical equipment.		Smooth black finish, good general strength, and dielectric properties.	Best "general purpose" characteristics with high dielectric strength: 745 Brown or black

FREE! Write for catalog, fully describing the wide range of DURITE phenolics for General Purpose, Heat Resistance, Electrical Resistance, Impact Resistance—and made-to-order modifications of standard materials embodying special characteristics to meet your specific requirements. Address:

THE BORDEN COMPANY · CHEMICAL DIVISION
Dept. MP-70, 350 Madison Avenue
New York 17, N. Y.

DURITE
Molding Powders · Binding Resins · Cements

"no more GAMBLING on tool steel selection"

[⅓ actual size; Selector is in 3 colors]

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Crucible Steel Company of America
Dept. MO, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name _____ Title _____

Company _____

Street _____

City _____ State _____

CRUCIBLE first name in special purpose steels

TOOL STEELS

fifty years of Fine *steelmaking*

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

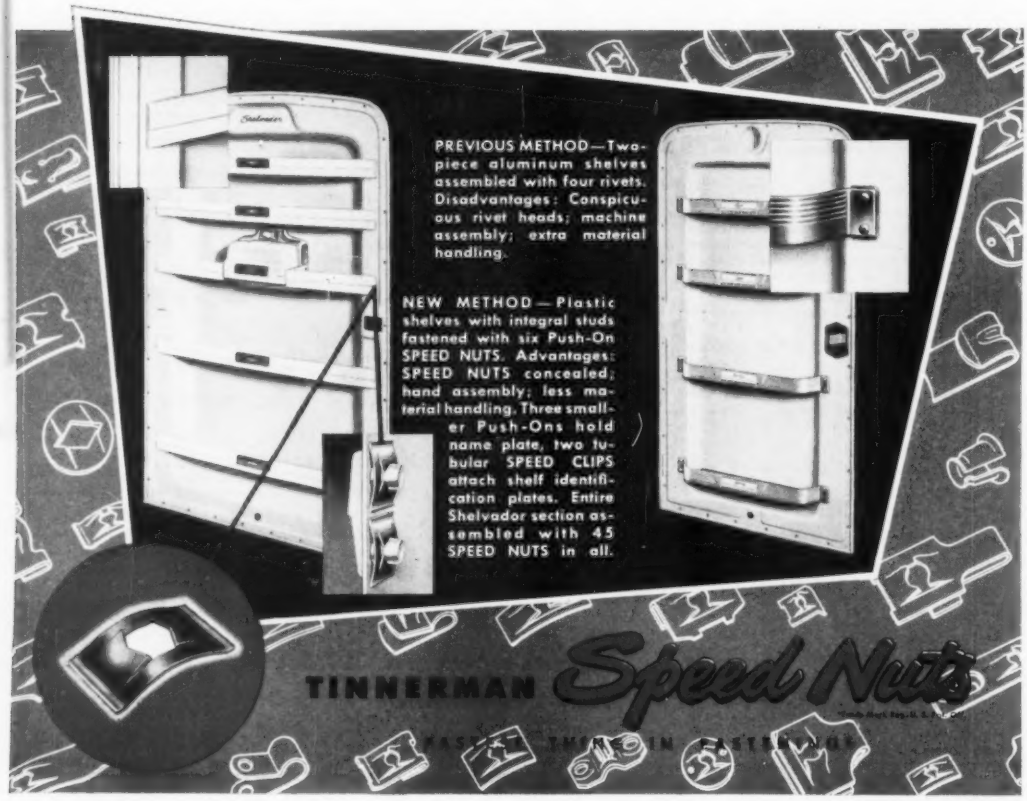
How ~~CROSLEY~~ "Traded-In" *Speed Nut Savings for* Better Shelvador® Design

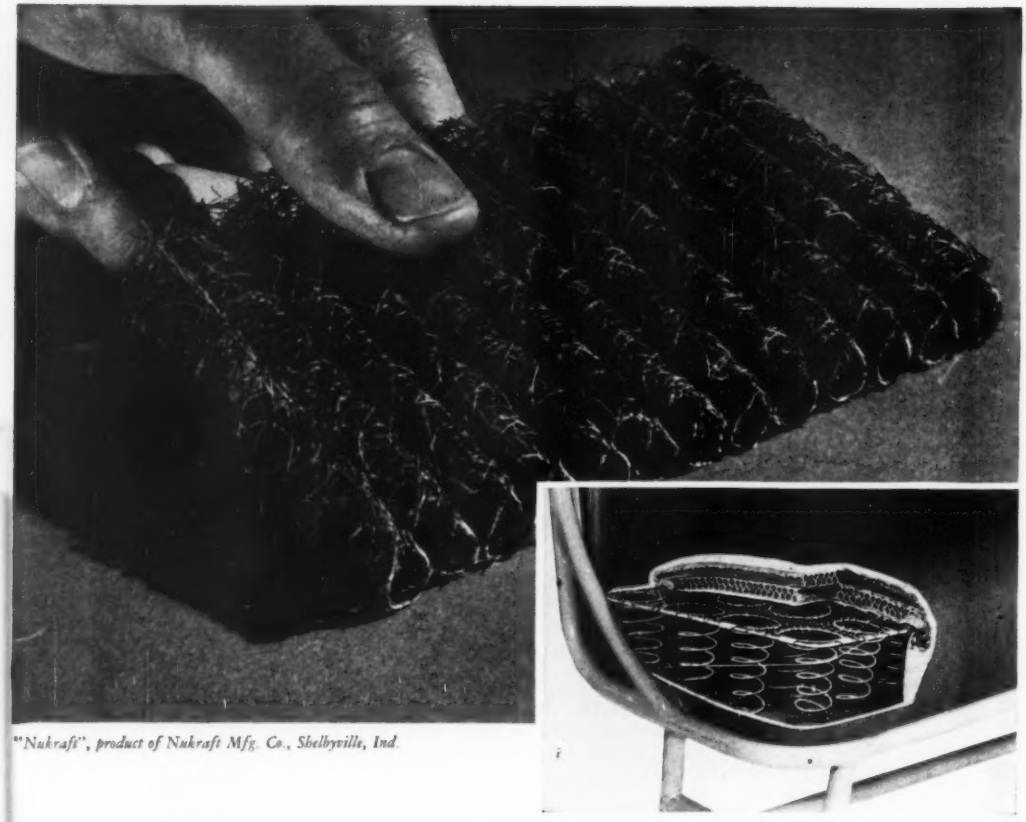
The 1950 Shelvador has been dressed up for even greater "buy-appeal" in 1950.

Crosley Division of AVCO Manufacturing Corporation has replaced riveted aluminum shelves with streamlined, gleaming plastic attached with Push-On SPEED NUTS—at no extra cost!

The assembly is now done by hand rather than machine, and the higher unit cost of the improved shelves is completely offset by a *49 percent SPEED NUT savings.*

You, too, can capitalize on savings from SPEED NUT brand fasteners. Ask your Tinnerman representative for details. Also write for booklet, "SPEED NUT Savings Stories". Tinnerman Products, Inc., 2040 Fulton Road, Cleveland 13, O. In Canada: Dominion Fasteners Limited, Hamilton.





"Nukraft", product of Nukraft Mfg. Co., Shelbyville, Ind.

This one cushions seating costs!

AMERICAN ANODE'S VERSATILE LATEX HELPS ANOTHER PRODUCT MAKE PROFITS

HERE'S a cushioning material that doesn't take a back seat to any. It's soft yet resilient. It distributes weight evenly over springs . . . keeps the surface of bus or car seats, chairs and mattresses even and smooth. The comfort it gives lasts, too. After years of service, installations showed the cushioning to be practically as good as new.

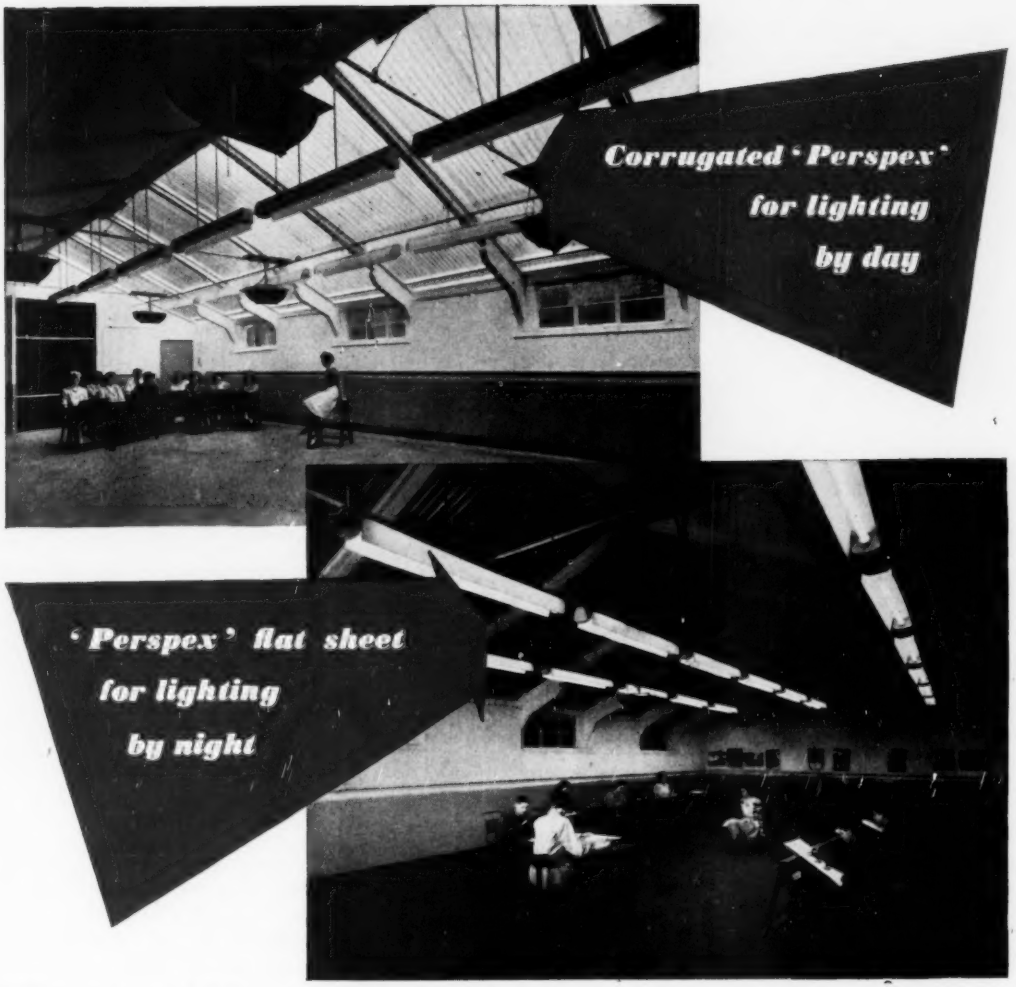
This remarkable material is made of selected, sterilized hog hair—strong in itself. The hair is dipped in American Anode latex, which acts as a binder, and formed into loops. Each hair is completely surrounded by latex, given added strength and elasticity. And cost-wise, it has a distinct advantage over other cushioning materials.

It's another example of the many ways that American Anode latex helps develop profitable products. For this versatile latex is used as a coating for textiles, paper and asbestos . . . as a cover for ironing boards and spark plugs . . . for radiator hose fabric, hose and plating racks. Many more uses are possible.

Perhaps American Anode latices can help you improve or develop products, start them on money-making careers. For information, write Dept. AC-4, American Anode Inc., 60 Cherry Street, Akron, O.

AMERICAN ANODE

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS, AMERAN RESIN PASTES



Versatile 'Perspex' acrylic sheet

To make the most of the daylight, more than fifty sheets of corrugated 'Perspex' have been installed on the north side of Manchester Art School's temporary building. At night, 'Perspex' lighting fittings, made by Thorn Electrical Industries Ltd., London, provide efficient, evenly diffused lighting. These two examples of the use of 'Perspex' in the field of lighting are typical of thousands of others found for this versatile material throughout the world.

'Perspex', in corrugated form, or as lighting fittings fabricated from flat sheet, gives a 24-hour lighting service.

'Perspex' is the registered trade mark of the acrylic sheet manufactured by I.C.I.

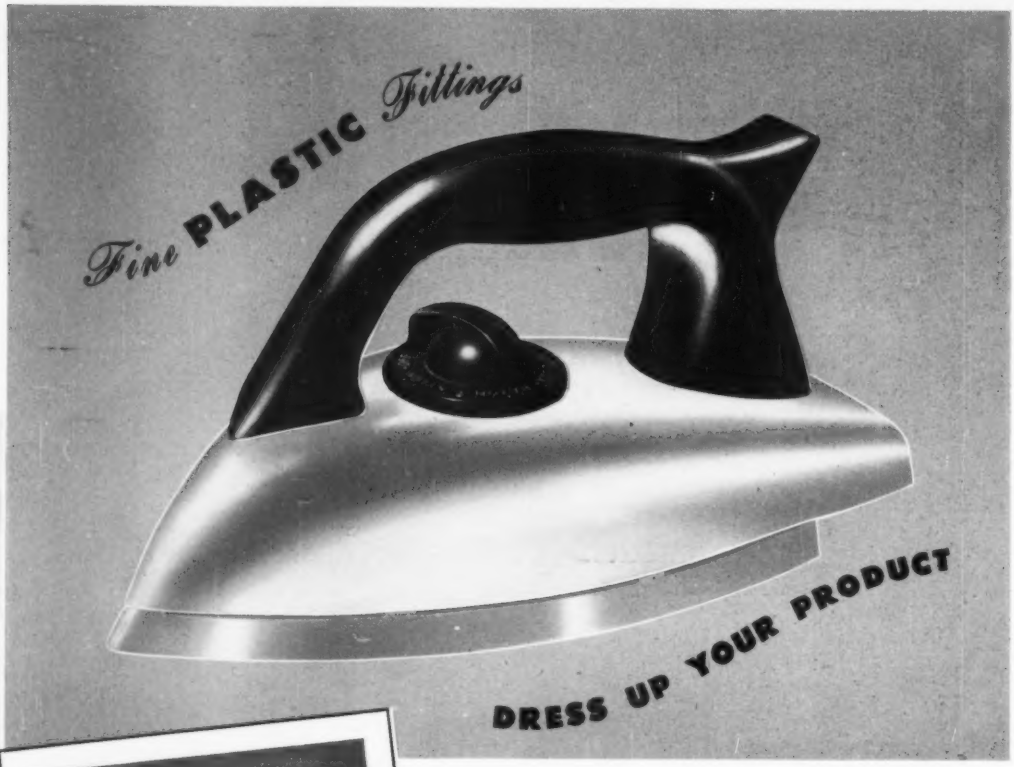
IMPERIAL CHEMICAL INDUSTRIES LIMITED

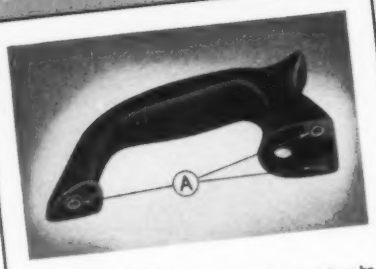
LONDON, ENGLAND

ICI

P 403

VISIT THE I.C.I. STAND AT CHICAGO COLISEUM





MOLDING MATERIAL
An economical general purpose phenolic material can be used because proper engineering has provided adequate insulation for the plastic parts. This material has ample strength and a fine finish that is pleasing to the touch.

MOLDING METHOD
The handle is molded in a 4 cavity semi-automatic top ram transfer mold. This method . . . combined with preforming and electronic preheating . . . provides a short molding cycle for a part with heavy cross sections. Electronic preheating, in addition to speeding the molding cycle, assures thorough curing of the part, despite a thickness variation of from 3/32" to 1". The knob is made in a 12 cavity semi-automatic compression mold.

MOLD DESIGN
The mold for the handle makes it possible to accurately place three inserts for facilitating assembly of the handle with the iron. The knob is molded with an insert to engage the splined shaft of the thermostat. A set screw hole is near the top of the insert. Graduations and lettering are molded in and later filled with white paint for permanent legibility.

The ability of plastics to fulfill structural needs . . . to provide pleasing lines and smooth, glossy surfaces has been accepted by the most discriminating manufacturers. The new Middleton electric iron is but one instance where increased sales appeal and reduced construction costs were provided by the intelligent use of AICO molded plastic parts.

Take full advantage of plastics. Let AICO engineers apply them to your product. Backed by more than 30 years of precision molding experience, AICO is qualified to recommend the most practical combination of molding method and material. The best answer to your needs is AICO's sole objective.

Write for a free copy of Aico's "Portfolio of Plastics Applications." It describes 28 actual uses of Aico molded plastics. Send for your copy and see how plastics can be used to improve your products.

Aico PRECISION MOLDING

for over 30 years.

AMERICAN INSULATOR CORPORATION

New Freedom, Pa.

Sales Offices: Cleveland • Dayton • Detroit • New York • Philadelphia

MODERN PLASTICS

VOLUME 27 JULY 1950 NUMBER 11

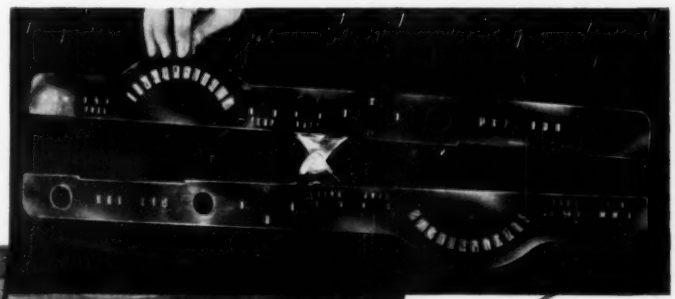
Thermoplastic BIG SHOTS

Significant trends in large injection molded pieces which are being produced to meet demands in many fields

THANKS primarily to a revolution in refrigerator design, huge injection moldings are now at a point in progress from which it is possible to assess trends in production and application of big thermoplastic pieces.

Other end-use fields have contributed to this progress; notably the automotive field, the television field, the display field, and the toilet-seat field. But more than half of the large pieces produced today are refrigerator parts, and current demand for still larger pieces centers in refrigerator design.

So big is this present demand for thermoplastic big shots that orders for machines of 32-oz. and greater capacity are six to eight months ahead, and the output of such machines is frequently sold in advance of installation. With 47 plants having injection presses of 32-oz. capacity or better and 13 or 14 having 48-oz. or larger presses, the seller's market in large pieces is something to behold. On order now are at least 30 presses of 60- to 80-oz. capacity, two more in the 120-oz. range, and at least one that will do a 200-oz.



COURTESY CRUVER MFG. CO.

1(above)—One-piece acrylic dial cluster for Mercury dash is molded in two-cavity die at a rate of 35 cycles per hour

COURTESY FORD NEWS BUREAU

2 (left)—Cluster as it appears when installed in 1950 Mercury

COURTESY CRUVER MFG. CO.

3—Machine operator removing Mercury dash cluster from mold

shot. On the drawing boards are still larger presses; they'll sell easily when they are ready to be built; their output will probably be booked in advance. An idea of the colossal investment represented by this trend toward larger machines may be had from the fact that one mid-western molding plant this year is putting a million dollars into new, large presses and accessories.

Of course, large thermoplastic pieces have been made for several years—mostly on unconventional presses. The Exide storage battery for jet planes[1] was molded in two glued-together parts by Prolon Div., Pro-phy-lac-tic Brush Co., Florence, Mass.; then it was molded in a single unit by Stokes Molded Products, Inc., Trenton, N. J., on the famous "tin can" press[2]; more recently, similar-size battery cases have been molded by Mack Molding Co., Arlington, Vt., in its private-design vertical transfer-type presses. Steering wheels have been molded in large sizes for several years, some on unconventional presses.

Engineering Gimmicks

There has also been considerable large-piece molding on medium-size conventional injection machines (16-22-32 oz.) by engineering gimmicks which made it possible to produce moldings larger than the rated capacity of the press. Satisfactory pieces have been made by using two injection strokes to fill out a large mold. It is also possible to "pack" the injection cylinder. In this "packing" trick, the piston is operated two or three times with the mold closed and a piece in it. As a result, more than the normal amount of material is compacted into the cylinder for the next shot. While "packing" is generally conceded to produce better parts than double-stroke injection, it slows the cycle, strains the machine, and is poor operating practice. Some machines have had their capacities upped by the use of bigger cylinders, which throws the pressure ratio of clamps vs. injection out of balance if large-area pieces are being molded.

Today it is no longer necessary to use conversions and gimmicks

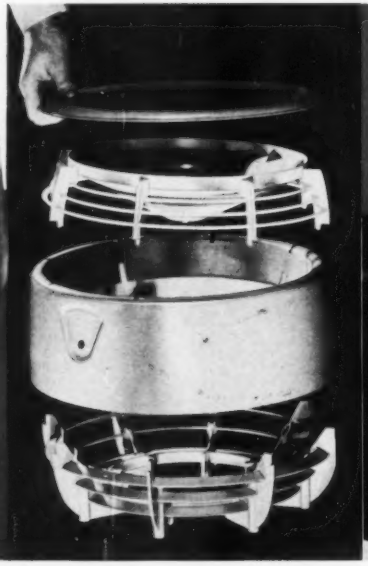
[1] See "Industrial and Machinery Award," MODERN PLASTICS 26, 137 (Sept. 1948).
[2] See "One-Piece Molded Battery Case," MODERN PLASTICS 26, 81 (May 1949).

What Are the Limits?

For a look into the future of large injection molded thermoplastic pieces, the past may serve as a guide. In 1947, an 11-lb. compression molded piece was BIG; in 1950, 80 lb. of phenolic is being molded in one short press cycle. In 1947, the weight of injection molded thermoplastic pieces was referred to in ounces; today, even though pieces are still referred to in ounces, many machines are shooting 5 lb. of material in one cycle and machines are available that can inject 13 lb. of thermoplastic in one shot. Bigger ones are coming. One thing is sure: machinery and techniques will keep pace with the needs of end-users.

COURTESY GURT CORP.

4—Air circulator has housing made up of four molded plastic parts with a total weight of 6½ pounds



5—Circulator housing consists of thermosetting top piece; grille, cowl, base are molded of styrene

6—Base for circulator, shown below with sprue, is molded on 40-oz. machine in single-cavity die

PHOTOS COURTESY GENERAL AMERICAN TRANSPORTATION CORP.

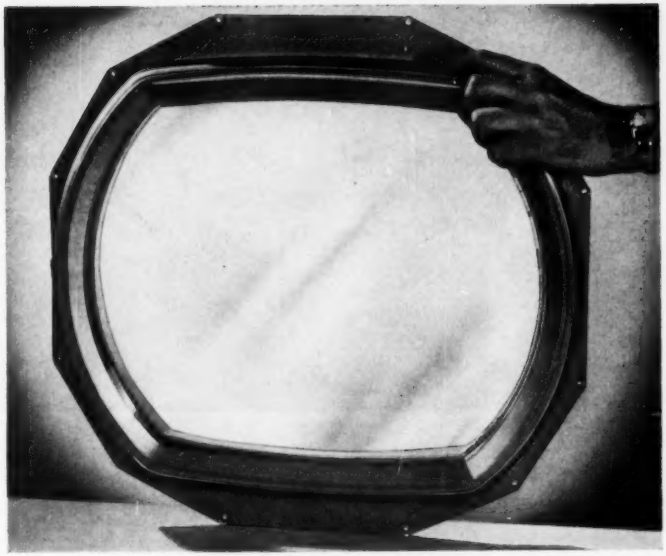
in order to produce satisfactory injection pieces in large sizes. Standard machines are made with ample capacity to plasticize and inject in one stroke of the piston the amount of material required for piece, sprue, and runners, with clamping pressure suitable for the job.

Developments in thermoplastic materials have kept pace with the demand for larger pieces and with injection machine progress. Styrene modifications, copolymers, more dimensionally stable cellulosics, and improved acrylics all have found new outlets in larger pieces.

In general, and in the case of refrigerators in particular, large injection-molded pieces are used to replace stamped enamelled metal. The plastic pieces have the advantages of light weight, freedom from odor and taste, resistance to chemical and moisture attack, warmth to the touch, and surface and color permanence. Probably most important of all, injection molded pieces have a definite design advantage in that they can be snappped into position easily in a fraction of the assembly time required for metal components.

Besides these ordinarily advantageous properties of plastics, Evans T. Morton, director of engineering, Major Appliance Div., Admiral Corp., Chicago, Ill., states that plastics are particularly good from the standpoint of heat conductivity and hence may be used wherever a thermo-break is required. He also stresses the fact that the possibilities inherent in large molded pieces enable the refrigerator maker to eliminate sub-assembly work by replacing as many as four or five parts in a previous assembly with a single piece of molded plastic. Both Mr. Morton and O. E. Norberg, manager, Appliance Engineering, Crosley Div., Avco Mfg. Corp., Cincinnati, Ohio, make a strong point of the unlimited decorative possibilities of plastics. The best example of this in large size is the inner doors of refrigerators, molded of transparent material and decorated from the back, giving beautiful multi-color detail and a smooth surface.

Not only metal, but wood, glass, and even fabricated plastic laminates are being displaced in certain applications by large molded thermoplastic pieces. In television, the mask framing the face of the video tube is frequently molded today, replacing wood; in at least two cases the mask contains an integrally molded lens which covers the whole face of the tube.

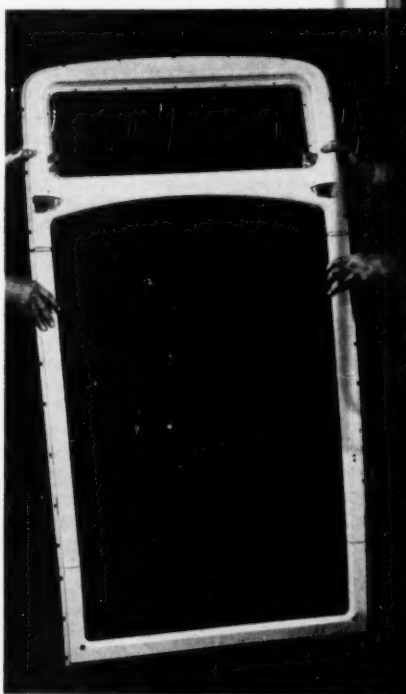


COURTESY LOMA PLASTICS, INC.

7—Escutcheon mask for 19-in. Admiral television set is molded of clear styrene; mask area is painted from rear. The piece measures 19 by 22 inches

The automotive field is beginning to use large injection moldings, too.[3] The Mercury dashboard cluster shown in Fig. 1, 2, and 3 is made by Cruver Mfg. Co., Chicago, Ill., in a two-cavity die at a rate of 35 cycles per hour. Both Lucite and Plexiglas powders are used. This cluster contains dial scales for speedometer, ammeter, radio, clock, and fuel and oil gages. It solves the problem of glass breakage in so large a piece, but the chief reason for its being made by injection molding is speed and quantity of production. The piece fits into a die casting on the cowl; hence dimensional accuracy was vital, and careful control of molding temperatures was necessary.

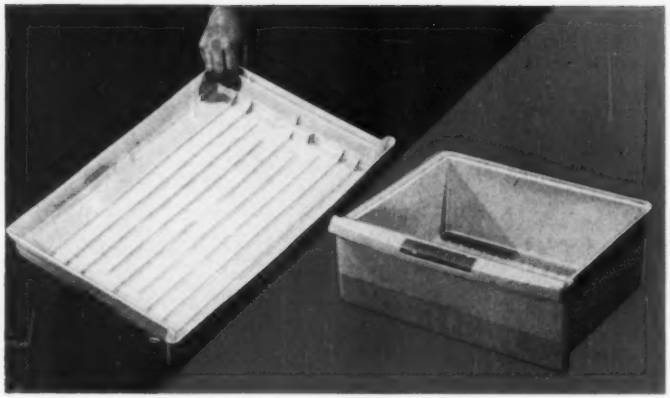
In more and more cases, large plastics components are planned, not to replace other materials, but to make possible—with reasonable economy—products that could not otherwise be made. A good example is the Fresh'nd-Aire Circulator de-



COURTESY CAMBRIDGE MOLDED PLASTICS CO.

8—Breaker strips are being replaced by larger breaker frames. This four-piece frame measures 31 by 62 inches

[3] See "Polystyrene Covers Cowl Panels in 1949 Nash," MODERN PLASTICS 26, 74 (June, 1949).



9—Freezer drawer for Admiral refrigerator is molded of high impact styrene material

10 — Refrigerator crisper pan is made of styrene. Mold temperatures are of critical importance

signed by Chas. E. Jones & Assoc., Inc., for the Fresh'nd-Aire Div., Cory Corp., Chicago, Ill. This product embodies eye-appeal, strength, utility, safety for children, and greatly decreased costs over other materials.

The product is illustrated in Fig. 4, 5, and 6. The housing is made up of an assembly of four large plastic parts: the top, the grille, the cowl, and the base. All are molded by General American Transportation Corp., Plastics Div., Chicago, Ill. Only the top disk is compression molded of a thermosetting material; all the other parts are injection molded of grey and yellow Styron. Total weight of plastic parts in the unit is 6½ pounds.

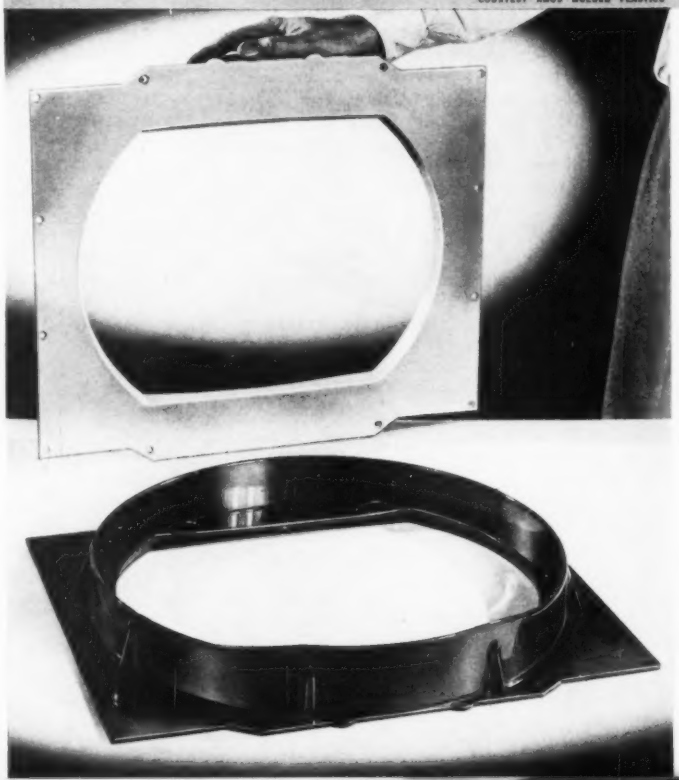
Only Plastics Would Do

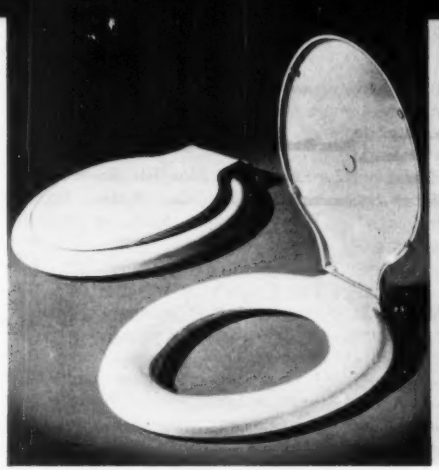
An examination of both the base and the grille in the exploded photograph in Fig. 5 shows that such a piece could literally not have been made at any reasonable cost by any other method or out of anything but a plastic material. The grille is made in a single-cavity mold on a 22-oz. machine. The base, also a single-cavity piece, is run on a 48-oz. machine. The cowl, which weighs over 42 oz., is produced in a single-cavity mold which has an ingenious toggle action core pull operated by an air cylinder to core the side switch hole and the engraved section on the cowl. This piece is also run on a 48-oz. press equipped with a special device to control the critical temperature of the mold, a step made necessary by the fact that there are certain extra-heavy sections designed to give strength to the molded part. Even on a 48-oz. machine it has been found necessary to maintain extra pressures and higher temperatures to assure the elimination of flow lines between the heavy sections.

A pioneer in this business of large injection moldings is Loma Plastics, Inc., Fort Worth, Texas. Figure 7 shows the 19-in. escutcheon mask made by Loma for Admiral Corp. This piece is 19 by 22 in. in size and has a 0.20-in. section in the center. It is molded of clear material and is decorated by painting the

11—RCA television mask, originally made of thermosetting material, is now being injection molded of styrene in double-gated converted compression mold

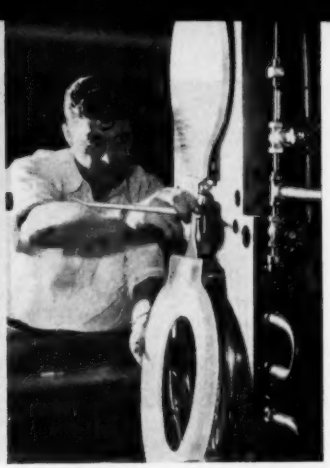
COURTESY AMOS MOLDED PLASTICS





13 (left)—Toilet seat is injection molded of cellulose acetate butyrate

PHOTOS COURTESY TENNESSEE EASTMAN CORP.



14 (right)—The lid and frame are molded simultaneously for color match

mask area from behind with gold. The shot is styrene (Dow 61, Monsanto P1X, Koppers 31 crystal) and weighs 51 ounces. The mold for this piece was a hot-runner type and had to be run at 184° in both cavity and core. A variation as little as 2-3° caused surface defects.

Figure 8 well illustrates the trend in refrigerator breaker-strip design as influenced by the use of large injection moldings. The strip is no longer a strip; it has become a frame 31 in. by 62 in. high. The four-piece breaker frame shown is made by Cambridge Molded Plastics Co., Cambridge, Ohio, for Admiral Corp. The top section is produced on a 32-oz. machine, the bottom on a 28-oz. machine, and the sides on a 16-oz. machine. Dow high-impact styrene was used throughout. The pieces are designed not only to snap together easily but to snap into position on the front of the refrigerator with a minimum of assembly labor. A further indication of the trend toward using even larger but fewer parts is the fact that forthcoming refrigerators will have this part made not of four pieces, but in one.

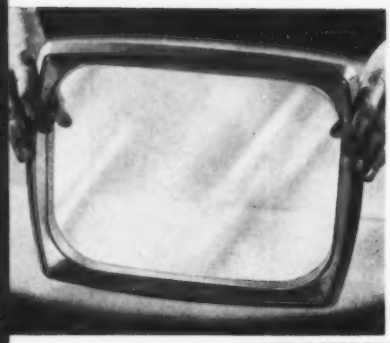
12—RCA television mask, shown below as it is being taken out of the mold, weighs over 33 ounces. Front surface has rough finish to reduce light reflection

COURTESY AMOS MOLDED PLASTICS

Two Admiral refrigerator parts—the freezer drawer shown in Fig. 9 and the hydrator or crisper pan shown in Fig. 10—are both made of Dow 475 impact Styron in grey. The freezer drawer is produced by Cambridge and the crisper pan by Loma. Again, particularly in the case of the Loma molding, the critical importance of mold temperatures is shown. The cavity side of this mold ran at 120°, the core side at 110°; the shot was center-gated with a small ¼-in. gate. Loma is currently cycling this 47-oz. shot at one per minute.

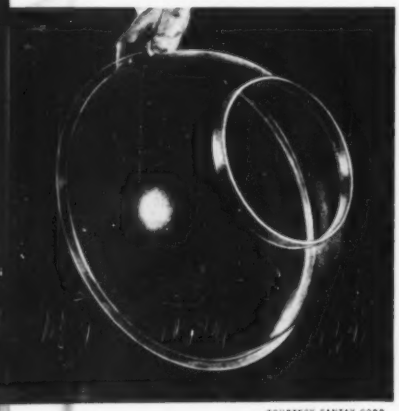
Compression Molds Converted

For purposes of increasing production speed from a given mold, there are some cases where molds originally made for large thermosetting pieces are being converted to injection molding. For example, the RCA television mask shown in Fig. 11 and 12 is now injection molded of styrene by Amos Molded Plastics, Edinburg, Ind., in con-



COURTESY SANTAY CORP.

15—Admiral television escutcheon and window is one piece of styrene



COURTESY SANTAY CORP.

16—Pop corn machine dome with deep draw is in one 29-oz. piece

verted compression molds. It is double-gated, weighs a little over 33 oz. and has heavy wall sections running up to as much as $\frac{7}{32}$ inch. The front surface of this part has a rough finish to reduce light reflection, the finish being produced by a sand-blasted surface in the mold. The main problem in converting the mold was that of securing proper draft for the various thicknesses required in the piece. In this piece, again, dead-on cycling and careful control of necessarily high mold temperatures overcame problems of preventing shrink and flow marks.

The cellulosics in the large injection molded scene are represented by the toilet seat shown in Fig. 13 and 14, molded for Beacon Plastic and Metal Products, Inc., New York, N. Y. The seat is molded of Tenite II cellulose acetate butyrate by the Panelyte Div., St. Regis Paper Co., New York, N. Y. Speed, economy, and the necessity for accuracy of color match between lid and frame were the reasons for doing this job in one molding operation; the cycle is less than 1½ minutes. Panelyte, with a large stake in refrigerator industry by virtue of its laminated inner door liner business, and fully aware of the trend toward greater use of large injection molded thermoplastic pieces, is stepping into injection molding of large parts with a new plant devoted exclusively to this work.

Another Admiral television escutcheon is shown in Fig. 15. This is molded by Santay Corp., Chicago, Ill., out of clear Styron. The shot weighs 28 oz. and, like the previously mentioned escutcheon, has the mask portion decorated from behind. By Santay, also, is the popcorn machine dome shown in Fig. 16. This is a 29-oz. piece with a very deep draw which required the use of heated molds and extremely close temperature control.

Glass Would be too Heavy

For Pabst Blue Ribbon beer, The Standard Products Co., Plastics Div., St. Clair, Mich., molded the Plexiglas sign shown in Fig. 17 and 18. Each piece weighs 34 oz., and has a projected area of 224 sq. in. and an average thickness of ⅛ inch. In this case, the piece could have been made of glass but would have been subject to breakage and would have weighed too much for economy of shipment and handling.

Figure 19 shows three refrigerator pieces turned out by Mack Molding Co. The center unit is a complete breaker frame for a small Crosley refrigerator; the two 54-in. long pieces are for the breaker-strip assembly on a larger refrigerator. As in previous refrigerator applications of large molded pieces, the fastening of these parts in assembly is vastly simplified over that possible with other materials.

Finally, in Fig. 20 the trend toward thermoplastic big shots is

COURTESY HYDRAULIC PRESS MFG. CO.

17—Blue Ribbon Beer sign is molded of acrylic in one piece. Sign weighs 34 oz., has 224-sq. in. projected area. Average wall thickness is ⅛ inch

shown as carried into the proprietary field by a bread box produced by The Plas-Tex Corp., Los Angeles, Calif. This box is 13½ by 9½ by 6½ in., is molded of styrene, and weighs 3 pounds.

The common denominators in molding problems encountered in all these cases are obvious. In these large-size pieces it is not possible to design for uniform wall thickness as has historically been required by injection molders for successful work. Indeed, in a single large piece there may be a combination of large-area and thick as well as thin sections. Especially on the pieces with large projected area, strains and flow lines must be avoided at all costs. Here the molding elements of carefully balanced heat (usually with the cavity a few degrees warmer than the force) and absolute control of temperature and cycle time must be watched. In cases where strain can not be avoided, annealing is recommended.

That extreme production speed can be obtained by molders working on these large pieces is shown by the fact that the Crosley breaker frame made by Mack with outside dimensions of 30 by 43 in. is produced on a 50-sec. cycle.

Along with the problems of temperature and speed control throughout the process of molding large pieces go the necessities for most careful gating for proper flow and more careful finishing of molds. Mold makers are rapidly learning the techniques required for this type of operation; seven manufacturers of big injection machines, who have been constantly experimenting with large moldings in their own shops for several years, have acquired much know-how which they are willing to bring to bear on problems concerning the molding of thermoplastic big shots.

COURTESY HYDRAULIC PRESS MFG. CO.

18—Acrylic sign for Blue Ribbon Beer is molded on 40-oz. injection machine. The circular part of sign is 14⅞ in. in diameter; the sign is 18¼ in. in length

COURTESY MACK MOLDING CO.

19—Breaker frame and strips for refrigerators are molded of styrene

COURTESY THE PLAS-TEX CORP.

20—Styrene bread box is 13½ by 9½ by 6½ in., weighs 3 pounds

Machinery and Mold Credits

Admiral breaker frame top. *Molded on 32-oz. Lester machine. Mold by Mechnical Industries, Inc.* Bottom *on 28-oz. Watson-Stillman machine. Molds by Nu-Eng.neering, Inc.* Sides *molded on 16-oz. Watson-Stillman. Molds by Una-Craft Engineering Co., Inc.*

Fresh'nd-Aire Circulator. *Grille molded on 22-oz. Reed-Prentice machine. Base molded on Watson-Stillman 48-oz. machine. Cowl molded on 48-oz. Watson-Stillman machine equipped with a Thermolator for accurate temperature control.*

Admiral television 19-in. escutcheon mask. *Molded on Crown machine; molds by Crown Machine & Tool Co.*

Freezer drawer. *Molded on 48-oz. Watson-Stillman machine. Mold by Nu-Engineering, Inc.* Crisper pan *molded on Crown machine. Molds by Crown Machine & Tool Co.*

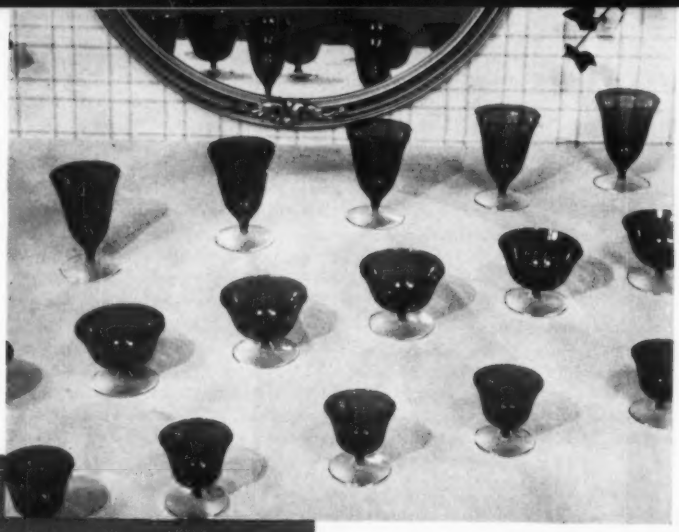
RCA television mask. *Molded on 48-oz. Watson-Stillman machine. Original compression mold by Molded Products Corp. Converted by Amos Molded Plastics.*

Pabst Blue Ribbon beer sign. *Molded on Hydraulic Press Mfg. Co.'s 40-oz. press.*

Refrigerator parts. *Molded on Mack Molding Co.'s private design presses*

Right: Three of six styles in one line of smart styrene stemware. Main part of each piece is transparent ruby; base is clear styrene

COURTESY MONSANTO CHEMICAL CO.



Below: Same bowls used in stemware shown are also joined directly to bases to produce footed pieces. Colors are transparent red, blue, and green bowls, clear stems

COURTESY F. J. KIRK MOLDING CO.

Styrene Stemware

Low-cost styrene cocktail glasses offer several selling advantages

THE beauty of glass without its brittleness and at a fraction of its cost—that is the secret of the success of styrene stemware. At least four companies are currently manufacturing molded styrene goblets, cocktail glasses, sherbert glasses, and other stemware. Their products are not only selling in competition with glass but, because of their low price, are opening new markets by making stemware available to many who could not previously afford it.

Universal Veilcot Co., Leominster, Mass., is molding a stemware line consisting of six styles, three of which are shown in the photograph at the top of this page. Universal Veilcot uses ruby transparent Lustrex for the main piece of each item and clear Lustrex for the base.

The table shown in the middle photograph is set with Poly-X Ware, manufactured by F. J. Kirk Molding Co., Clinton, Mass. Kirk's stemware is molded of heat-resistant Styron or Koppers styrene, and it is claimed that Poly-X Ware can withstand boiling water for 30 min.—a more severe test than it is likely to encounter in actual use.

Kirk's line consists of eight styles. The goblet, sherbet, wine glass, and cocktail glass are made with transparent red, blue, or green bowls and clear transparent stems and bases. The same four bowls are used in the footed tumbler, dessert dish, juice glass, and fruit cup. These four models have no stems and the bowls are joined directly to the bases.

The styrene cocktail glasses shown at the bottom of the page are molded by Schwarz Bros., Los Angeles, Calif., and distributed by Styson Art Products Co., New York.

Among the other manufacturers of styrene stemware is Plastics Mfg. Co., Dallas, Texas. This company makes a 12-oz. goblet, a 7-oz. sherbert, and a 6-in. saucer which can be used under either the sherbet or the goblet. Both the sherbert and the goblet have fluted outside surfaces and are available in transparent amber, green, blue, or red, as well as in clear styrene.

The Case of the Built-In Window

MANY electrical meters have had molded plastic cases, many have had transparent plastic scale windows, and many have had both. The Amprobe, a new pocket-size volt-ammeter for electricians, motor repair shops, etc., is unique because of the way in which its window is built-in as an integral part of the housing.

The Amprobe is a split core volt-ammeter only 7⅛ in. long and 2 9/16 in. wide and weighs only 12 ounces. The trigger-controlled jaws will surround conductors up to 1⅛ in. in diameter, and will measure current without interrupting service. Voltage measurements are made via a pair of test leads. The instrument is made in three models, each with seven ranges, controlled by a selector switch.

Ordinarily, the need for a window in an opaque housing complicates the design problem. It not only means an additional piece for the window itself, but it necessitates screws, metal frames, or other assembly devices to hold the window in place. This means more parts to produce and assemble in the first place—parts which can become loose when the instrument is in use.

Pyramid Instrument Co., New York, N. Y., manufacturer of the Amprobe, got around all these complications neatly. One half of the Amprobe housing is molded of clear transparent Tenite II cellulose acetate butyrate. The "window" area is then masked while the rest of the piece is sprayed with a black lacquer. The masked area then becomes a window which cannot come loose, which is as strong as the rest of the butyrate housing, and through which the scale can be viewed from almost any angle.

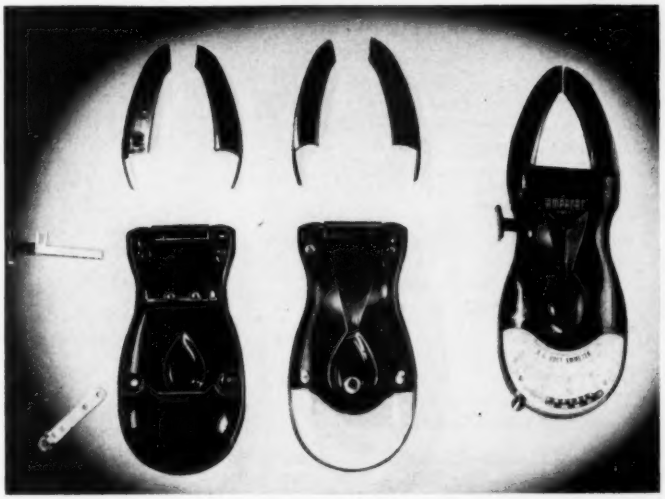
The name Amprobe is molded-in to the rear surface of the piece, and red paint is wiped in to the depressed letters. The area around this nameplate is also masked when the outside surface of the piece is sprayed black. The outside of the nameplate is thus smooth and free of dirt-catching indentations.

The back half of the Amprobe housing is molded of black butyrate and has a number of molded-in brass inserts for mounting screws. Black butyrate is also used for the four insulating shields which encase the metal probe jaws, for the finger grip on the trigger which controls the jaws, and for the knob of the range-selector switch. All the plastic parts are produced for Pyramid by Gemloid Corp., Elmhurst, N. Y. The parts are molded on a 4-oz. Watson-Stillman machine.

The butyrate probe jaw casings make it possible to use the instrument on uninsulated conductors with complete safety.

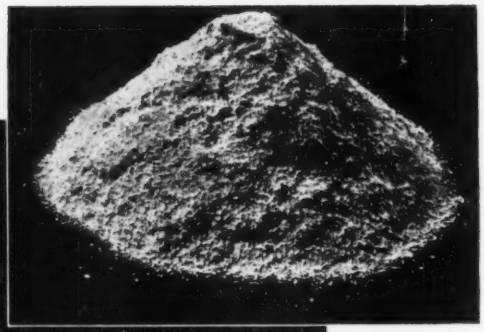
One of the transformer jaws is stationary; the other is held in the closed position by a spring and can be opened by pressing the trigger on the side of the Amprobe. The butyrate end of the trigger is molded directly onto the metal shaft. The butyrate knob of the range selector arm is molded in the same way and an index line is molded in.

Volt-ammeter measures current in conductor without interrupting service. Jaws are operated by finger trigger. Front of housing is molded of transparent material, then sprayed with black lacquer. Part of housing over scale is masked to leave window area clear



All plastic parts of pocket-size unit are of cellulose acetate butyrate. Name is molded-in to rear surface. Housing has molded-in brass inserts to receive mounting screws. Jaw casings make the instrument safe for use on uninsulated conductors

Below: Raw material for resin-bonded wood-waste board goes into hogging machine which reduces it to coarse sawdust. Right: A mound of finely divided wood waste prior to mixing with resin



Improving on

NO longer is sawdust just a waste product to be burned beneath the plant boiler or scattered on the floor of the corner butcher shop. Now, in proper combination with thermosetting resins, sawdust is emerging as a basic component of many useful products ranging from molded croquet balls and furniture core stock to smooth, grain-free panels which are in many ways superior to plywood for panel doors, kitchen cabinet construction, and related items. All this means that industry has an important new low-cost material and that the lumber trade can look forward to more complete utilization of our timber supplies.[1]

Man has never been quite satisfied with nature's wood as a raw material. Countless hours of research have been spent in an attempt to learn how to overcome some of the natural limitations of wood, as well as to reduce the enormous waste that occurs between the felling of a tree and its ultimate conversion into a finished product. Plywood represented a major step in this direction. In the newer science of combining finely divided wood with selected resins, important new production milestones have been established.

One of the outstanding examples of recent developments in this field is Prespine, a board made from wood-waste with phenolic resin binder. Developed by Curtis Companies, Inc., Clinton, Iowa, Prespine is now in regular production at the company's Clinton plant. At the present time, the entire output of Prespine is being used by Curtis for its own line of woodwork—notably panel doors, both interior and exterior, and kitchen cabinets, which are built at the company's Sioux City, Iowa, plant. The finished board consists of approximately 93% finely divided wood from the organization's own manufacturing operations. It is produced in sheets measuring 4 ft. square by ¼ in. thick, and in two finishes—a plain, grainless effect used for products which are to be painted, such as kitchen cabinets, and a new grained surface which duplicates the appearance of Ponderosa pine and can be finished in exactly the same manner as the natural wood. The specific gravity of the material is about 1.0. No chemical changes in the finely divided wood particles themselves are involved in the product's manufacture.

Plus Values

What are the plus values of this engineered wood product? Prespine

[1] See also "Wood Waste Moldings Find New Markets," MODERN PLASTICS, 27, 90 (Oct. 1949), and "Resins Bond Wood Waste Board," MODERN PLASTICS, 26, 59 (Feb. 1949).

panels resist warping, swelling, shrinking, and heavy impact blows. Tests indicate that Prespine's resistance to denting is approximately 10 times that of natural wood. Its color closely simulates that of pine and does not vary as much as that of the natural wood. Flexural strength compares favorably with solid wood of the same width and thickness.

Prespine provides a good surface for paint. There is no actual grain to present painting problems. The panels with imprinted grains readily accept stains, shellac, and varnish. Either surface can be waxed or washed after finishing. The grained pattern is reported to be fade-proof. Prespine has good weather resistance when finished. Sample door panels, exposed unprotected to weather on the roof of the Curtis plant for as long as two years, have exhibited only slight weathering and soiling, with no apparent deterioration. Prespine's freedom from grain checking—a common problem with wood—and the fact that it can be readily glued with standard woodworking adhesives are additional advantages attributed to the product.

Because of its resin content and method of manufacture, Prespine requires no pampering. In tests, sample pieces were boiled 3 hr., then frozen immediately and dried for 16 hr. at 140° F.; no serious ill effects were found. In other tests, the material was continuously submerged in water for seven months. When sanded, the surface was easily restored to its original condition. Manufacturing requirements call for a modulus of rupture above 4000 p.s.i. The material has proved especially resistant to the damage usually experienced in warehousing, shipping, and handling.

Price Differential

At the present time, the cost of Prespine panels is less than that of Ponderosa pine plywood. This differential varies with changing conditions which affect the availability and manufacturing costs of the plywood.

A three-year research and development program, during which time hundreds of test panels were made, preceded commercial production of Prespine. Preliminary work was done on small test panels, using a Carver press. Rosins, pitch, various resins, and numerous other materials were tried in an attempt to locate the best type of binder. Since the product had to meet the same standards of performance as exterior plywood, phenolic-resin binders eventually proved most successful. Early panels were made with a two-stage resin; later a single-stage resin was adopted in order to obtain a lighter color in the finished panels.

Following the successful production of small panels on a laboratory basis, larger test pieces were molded for further evaluation. Successful tests of the larger panels led to establishment of the present plant at Clinton, Iowa, involving the acquisition of a five-opening press with 48-in. square platens, of the type used in plywood production. The company also obtained a hammer mill for reducing wood to the

Nature's Wood

Panels of phenolic resin plus sawdust replace wood in many applications

Batch of sawdust on way to pan-loading unit after mixing with about 7% phenolic resin

Aluminum pans, 4 ft. sq., are filled with layer of mixture and put in loading device beside press. At end of molding cycle, five new pans are pushed in

required degree of fineness and designed its own pan filler, loader, and supplementary equipment.

At the outset, the Prespine activity was primarily a defensive measure, activated because of a growing scarcity of Pondersosa pine plywood. The project proved so successful, however, that even when the plywood situation improved, Curtis management decided to keep most of its panel-door and kitchen-unit output in Prespine because of the favorable characteristics of the product.

Production Steps

The rough wood waste used in the manufacture of Prespine includes shavings, sawdust, and waste chunks of lumber. Most of it comes from the molders, saws, and other machines used by Curtis in its extensive woodworking operations. Fine material is carried directly to the production department via overhead blowers; larger pieces are first run through a hogging machine which reduces them to coarse sawdust. Selective control of the plant blower system makes it possible to send through only the types of wood waste needed at any time.

The coarse wood particles collect in a 12-ton capacity bin on the roof of the manufacturing building. From this bin, the material is mechanically fed through magnetic separators, which remove tramp iron, nails, etc., and thence through the hammer mill. The resulting finely divided wood particles move by gravity to the first floor of the building, where they are carried by a worm conveyor and belt conveyor to the mixer, in which the wood particles are combined with the resin.

Production is handled on a batch-process basis. For each batch, approximately 7% of dry phenolic resin is added by weight. Upon completion of the mixing process, the wood-resin combination is carried by belt conveyor to the pan-filling machine where aluminum pans, 4 ft. sq., pass beneath the filling unit to be filled to a uniform depth of about $1\frac{3}{4}$ inches. The loose material is compressed to approximately one-sixth of this thickness during the molding operation.

After the pans are filled, they are placed on a loading device beside the press. This permits one group of pans to be loaded while the preceding group is in the press. At the end of each molding cycle, the press opens and the loading device pushes the loaded pans into the press, forcing the preceding group of pans out onto the unloader. As the trays are removed from the unloader, they are inverted to permit the freshly molded panels to drop out. Next the panels are cooled and humidified. Then they are trimmed and sanded and are ready to be used in panel doors or other types of woodwork.

Panels Four Feet Square

Phenolic resins used in the production of Prespine are supplied by Monsanto Chemical Co. and Durez Plastics & Chemicals, Inc. Production at present is confined to the 4-ft. square panels, but the company points out that making larger panels would merely require larger equipment, with no basic difference in the method used.

The ungrained Prespine is widely used by Curtis in its line of kitchen units—ends, backs, drawer bottoms, and doors. A typical kitchen-cabinet installation contains more than 250 sq. ft. of the material. The newer grained material is utilized as panels for both interior and exterior doors. All exterior doors receive a water-repellent treatment which further increases their resistance to the effects of exposure.

Although details of the process used in graining remain confidential, the process involves surface application of specially developed inks which are receptive to such finishes as varnish, shellac, and stains. The actual pattern is a photographic reproduction of selected Ponderosa pine grain.

Curtis has experimentally produced molded panels which illustrate possible ramifications of the basic production program. Such moldings would offer interesting economies as compared to those fabricated from lumber in the usual manner. Such additional applications as floor covering and subflooring, counter tops, and various furniture items readily suggest themselves.

With proper application of heat, some contouring of Prespine is possible, although the full potential of the material for this use has not yet been established. Some work has also been done with the introduction of color in the mix, but in the regular production panels, the color is that of the wood particles themselves.

Back of press shows control panel (left) and unloader (right) onto which pans of cured panels are pushed upon completion of each molding cycle

Panels are cooled and humidified, then sanded and flash trimmed. They are then ready for use

Hyatt Award

George M. Powell, III

PRESENTATION of the John Wesley Hyatt award for 1949 was made to George M. Powell, III, at a dinner at the Hotel Pierre, New York City, on June 1st. This award, consisting of a gold medal and $1000, is presented annually by the John Wesley Hyatt Award Committee for outstanding achievement in the plastics industry during the preceding calendar year.

Mr. Powell is technical head, Coatings Div., Research & Development Dept., Carbide & Carbon Chemicals Div., Union Carbide and Carbon Corp. He was chosen as the award winner for his planning and direction of the development, formulation, and application of Vinylite dispersion resins. He was primarily responsible for the development of a method which makes possible the use of high polymers in high-solids dispersions in combination with inexpensive thinners. The toughest and least soluble of the vinyl resins can be used economically for inks, dip goods, elastometric molded articles and unsupported films, and to coat cloth, paper, foil, and metal. Mr. Powell's work enabled the plastics industry to enter the manufacture of products never before practical with materials usually associated with this industry.

The rapidity with which the dispersion resins have been adopted by industry is a measure of their worth. Although development work on them began in 1934, the material was not ready to be offered to industry until nine years later. By 1947, the consumption had grown to 5 million pounds. Two years later, the major production processes for finished articles had been perfected, and consumption rose to more than 15 million pounds.

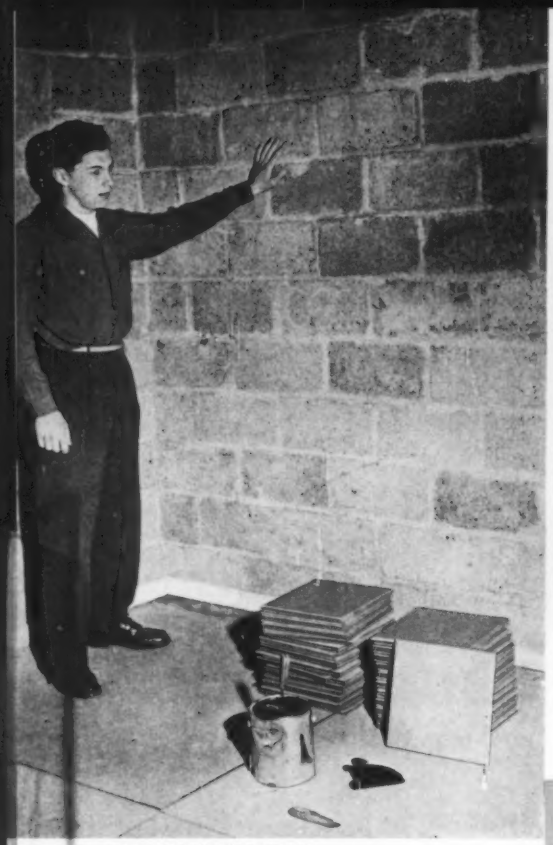
Mr. Powell was born in Montgomery, Ala. After graduating from high school in Leonia, N. J., he entered Columbia College in 1927, receiving an A.B. degree in 1931. He then transferred to the School of Chemical Engineering, receiving a B.S. in chemical engineering in 1932, and the Ch.E. degree in 1933.

In that year, also, he joined Carbide & Carbon Chemicals Corp., and immediately engaged in research on surface coatings. He was made technical head of the Coatings Div. in 1944.

Mr. Powell has made numerous contributions to the work of the Coatings Div. Seven patents have been issued to him, and others are pending. The research work leading to the present large-scale development of dispersion resins was initiated several years before World War II, but it was not until emulsion polymerized resin became commercially available that major emphasis was placed on the problem. Mr. Powell was assigned to this project before he became head of the division, and continued to devote a great deal of his attention to it after his advancement.

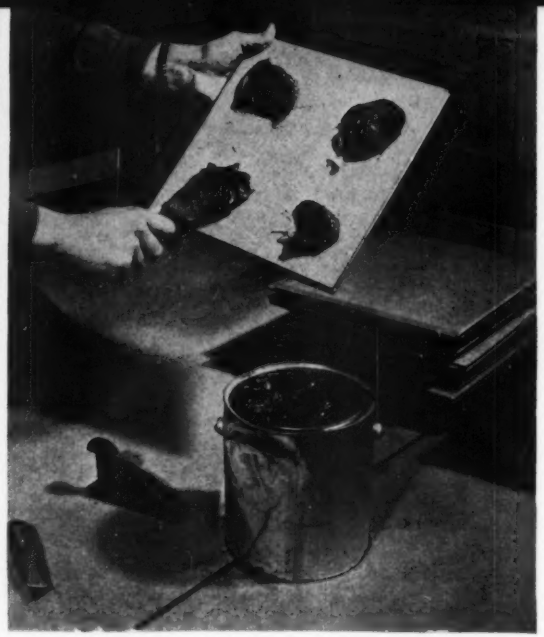
Mr. Powell is the recipient of the ninth John Wesley Hyatt Award, which is sponsored by Hercules Powder Co. to honor Hyatt, father of the plastics industry. It was Hyatt's work with cellulose nitrate and camphor, in 1867, which resulted in the making of the first thermoplastic celluloid.

Members of the 1949 Hyatt award Committee are: Horace Gooch, Jr., president, Society of the Plastics Industry, Inc.; Dr. George T. Felbeck, vice president, Carbide & Carbon Chemicals Corp.; Dr. Ernest H. Volwiler, president American Chemical Society; Dr. Charles F. Kettering, vice president, General Motors Corp.; Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research; Dean Richard F. Bach, Metropolitan Museum of Art; William T. Cruse, executive vice president, Society of the Plastics Industry, Inc.; and Waldemar Kaempffert, Science Editor, *New York Times*.



ALL PHOTOS COURTESY FIRESTONE PLASTICS CO.

1—Tools needed to apply tile to any rigid surface include putty knife, fiber-board knife, and stapler



2—Cement is applied to four corners of vinyl-covered tile. Thick globs are recommended for rough, uneven wall surfaces

Washable

DURABLE, decorative wall surfaces can be installed simply and economically with a new vinyl-covered insulating tile panel manufactured by Page Tile Co., Cresskill, N. J. The 12-in. squares of ½-in. thick building board are covered with 12-gage Velon which is bent over the bevelled front edges and crimped into a slot in the side of the tile.

The vinyl-covered tiles can be used for decorative walls or ceilings in homes, offices, or stores. Unusual effects can be obtained by using the tiles for only one wall of a room, by using the tiles for the lower part of the walls only, or by using two different colors. The Velon surface of the finished installation is colorful, washable, and will withstand long, hard wear without cracking, chipping, or discoloring.

The tongue-and-grooved Page tile panels can be applied to any rigid wall surface, even directly to cement block walls.

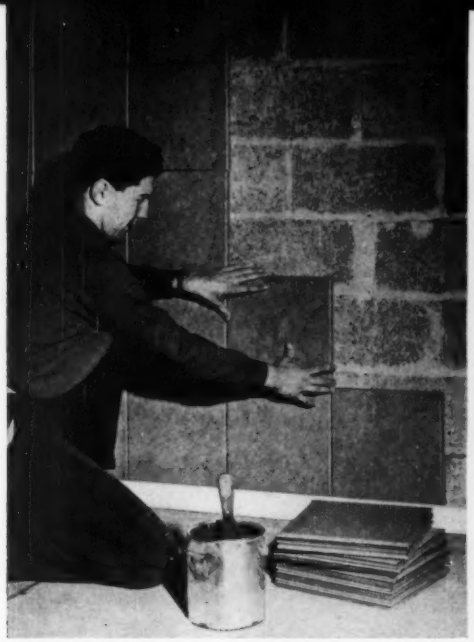
For basement or bathroom installations, a waterproofed board is available for only 2¢ per sq. ft. more than the standard tile panel.

The actual installation of the Velon-covered panels requires no special skill. Any home owner or handyman can do the job. The only tools required are a fiber-board razor knife, a putty knife, and a swing-open type of office stapler.

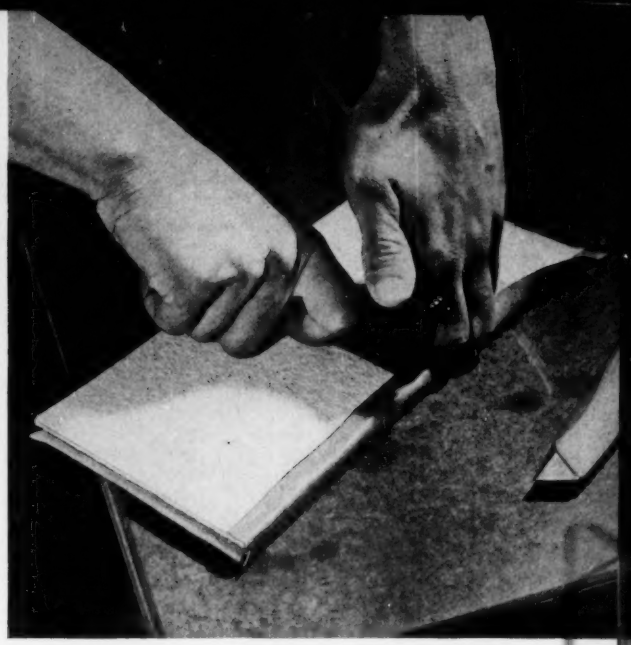
The necessary tools and a pile of Page tile panels are shown in Fig. 1 in front of an ordinary unfinished cement block wall.

The wall to which the panels are to be applied must be free of grease, wall paper, calcimine, or white wash because the bond between the tile panels and the wall can be no stronger than the bond between the wall and the surface to which the panels are cemented.

The cement, supplied by Page, is applied to the four corners of each tile with the putty knife (Fig. 2). A glob of cement about 2 in. in diameter and ⅛ in. thick should be applied in each corner if the tile is to be applied to a relatively smooth surface. Thicker globs are recommended when the wall surface is rough or uneven. A fifth glob should be put in the center of each panel when ceiling installations are being made.



3—Tile is pressed to wall with tongues on right and top edges and slid into place with a slight circular motion



4—When a tile is cut to fit an odd-size space, the vinyl cover is cut 1 in. longer than needed and is stapled to back of board

Insulating Tile

Buyers will be encouraged to do their own interior decoration with this easily applied, durable material

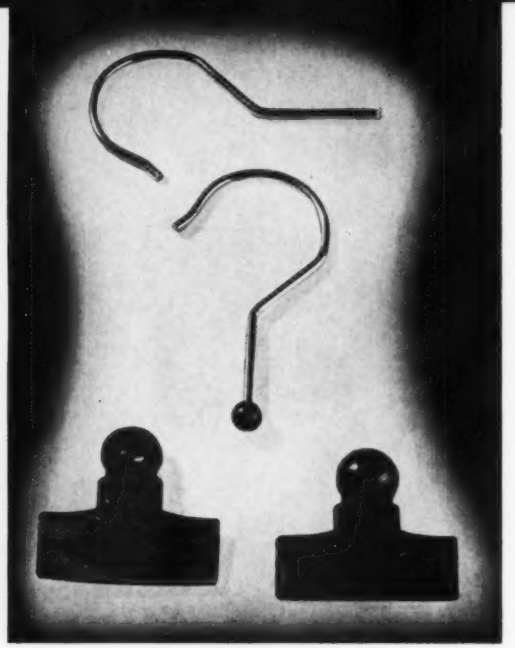
After the cement is applied, the tile is pressed against the wall with the tongues on the top and right edges (Fig. 3). Each tile is slid into place with a slight circular motion to spread the adhesive.

When tiles must be cut to fit into corners or around windows or doors, the vinyl is cut off first 1 in. longer than is needed, and folded back while the tile is cut to the exact size with a razor knife. The loose vinyl is then pulled over the cut edge and stapled to the back surface of the insulating board (Fig. 4).

Fig. 5 shows the finished installation on the wall shown in Fig. 1.

5—Colorful, durable vinyl-covered surface of finished installation can be washed when dirty

Molded-in grooves in clothes hanger prevent garments from sliding. Base of ball-and-socket joint is designed as a name-plate



Two socket halves are cemented around ball molded to metal hook. Assembly is used as mold insert for main hanger part

Double-Molded Clothes Hanger

TWO-shot injection molding is used in an unusual manner to produce the strong swivel joint of the Multi-Purpose Space-Saver Garments Hanger molded by St. Clair Plastics, Watervliet, N. Y., and distributed by Ralph H. Goldman Enterprises, New York, N. Y.

The first step in the production of the hanger is molding the ball-and-socket swivel joint, which consists of three pieces of Plexene T styrene copolymer. The ball is molded directly on the bottom end of the metal hook, which is placed in the die as an insert. The high impact strength of the material and the method of molding combine to make an inseparable bond between the ball and the metal hook.

At the same time that the ball is being molded, the socket is molded in two halves of the same maroon-colored, Plexene material. The socket is designed so that the bottom part of it serves as a plaque or name-plate for the hanger.

After the three parts are molded, the two halves of the socket are cemented together surrounding the ball.

Socket Used as Insert

The entire ball-and-socket assembly is then used as an insert in the mold for the main part of the hanger, which is molded of Lustrex styrene. The material flows around the socket and plaque assembly and thus serves as extra insurance that the two parts of the sockets will not come apart.

The main body of the hanger is molded in either transparent blue, transparent red, or clear material. Thus the maroon Plexene swivel socket and plaque shows through, although the faces of the plaque are covered by the body of the hanger.

St. Clair Plastics molds the hangers on a 22-oz. Impco machine in molds made by Longbrake Mold & Die Co., Kenton, Ohio. According to the molder, the method of molding makes it necessary for the mold maker to hold unusually close tolerances in the cavities. Double molding also necessitates close control of temperature, time, and pressure during the molding operation.

Unusual Features

In addition to the method of molding and the swivel joint, the Space Saver hanger has many unusual design features which add to its utility and versatility. The most obvious of these is the multi-bar construction which greatly increases the capacity of the hanger and thereby increases the capacity of small closets. Three pairs of pants, a coat and vest, and a number of ties and belts can all be hung on one hanger. The distributor emphasizes this feature by referring to the hanger as the "Space-Saver Garments (plural!) Hanger (singular!)."

The hanger also has a non-skid feature. Trousers, skirts, or towels hung on the cross bars cannot slide off because a number of grooves and ridges are molded-in to the full length of each bar.

Toy Autos With Remote Controls

REALISM is the oustanding trend in toy design. In toy cars, realism is often carried to the extent of providing means for steering and controlling the toy. Three examples of such toys are shown on this page. One of the cars shown is powered by flashlight batteries, one by a spring-wind motor, and one by a hand crank. All of them are molded of cellulose acetate.

The Remoto-Car, shown at the top of the page, has a body and a control box molded of Tenite I cellulose acetate. The car is molded of red or green metallic acetate; the control box is black and yellow.

The car is wired with flashlight cells in the control box and is controlled by a three-way switch on top of the box. Pressing one end of the switch makes the car go forward; pressing the other end makes it go backward. The car can also be made to turn to the right by pressing and releasing the "forward" end of the switch rapidly.

The Remoto-Car is manufactured by Arpin Products, Inc., East Orange, N. J.

The Steer-It, shown in the middle photograph. has a spring-wind motor which propels it for over 150 ft. at each winding on practically any surface, including rugs. The motor can be started and its speed controlled by a "gear shift lever" which projects out the rear window. There is also a "safety catch" which stops the motor and prevents it from running down when the car is lifted off the floor.

The car is steered by a wheel which is mounted on an "instrument panel" and connected to the car by 3 ft. of spring wire which extends like an aerial from the car roof. Through this wire, the steering wheel controls a hidden fifth wheel which turns the car.

The 10-in. long body of the car, the steering wheel, and the instrument panel are molded of red or blue Ampacet cellulose acetate by Plastic Molded Arts, Inc., Long Island City, N. Y. The Steer-It car is manufactured by Motion Toy Corp., Rockaway Beach, N. Y.

The Miracle Control Car, shown at the bottom of the page, is both powered and steered by a remote control device which uses neither springs nor batteries. A reel attached to a pistol-grip handle is turned clockwise to make the car move forward and counter-clockwise to make it move backward. The motion is transmitted to the car by a flexible shaft. To make the car turn, the reel is pushed forward on the pistol grip handle for right turns and pulled back on the handle for left turns.

The body of the car, which was designed as a replica of a Hudson convertible, is molded of red and gray Tenite I cellulose acetate. The Miracle Control Car is manufactured by California Moulders, Inc., Los Angeles, Calif.

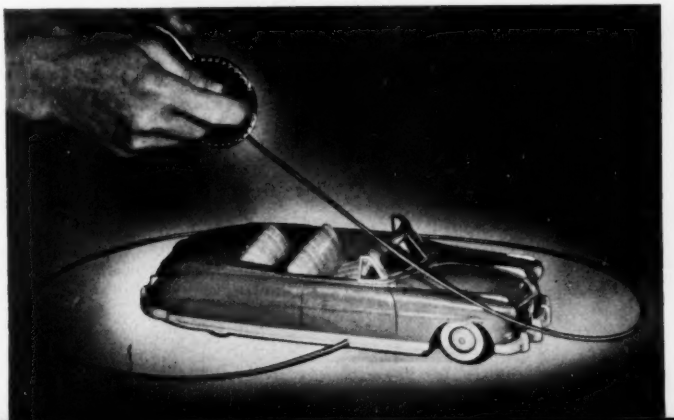
COURTESY TENNESSEE EASTMAN CORP.

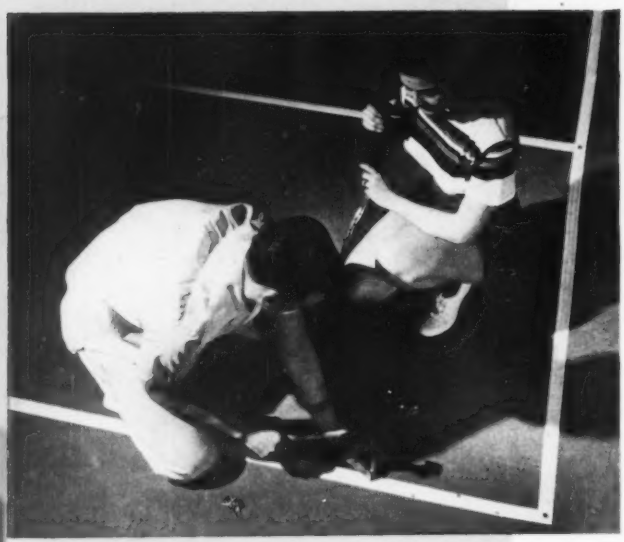
Acetate Remoto-Car is directed by switch, powered by flashlight cells

COURTESY HERCULES POWDER CO.

Steer-It, molded of cellulose acetate, has spring-wind motor. Small steering wheel, mounted on hand-held dash panel, controls car through flexible shaft

Miracle Control Car, a scale model of Hudson convertible, is propelled by turning reel. Car is steered by moving reel forward or backward on handle





Left: Tape for marking base lines, service lines, and other lines on tennis courts is extruded of Geon vinyl. Unlike cotton tapes which rot, stain, discolor, or break, the vinyl tape will not rot, will stay white, and is unaffected by water or by the chemical weed killers used on tennis courts. The tape, known as Rextrude, is made in two sets. One, for courts where playing traffic is light, is stapled to the ground. Heavy duty set, for public courts which are used frequently, has holes 2 in. apart, for nailing tape to the ground. Made by The Rex Corp., 51 Landsdowne St., Cambridge, Mass.

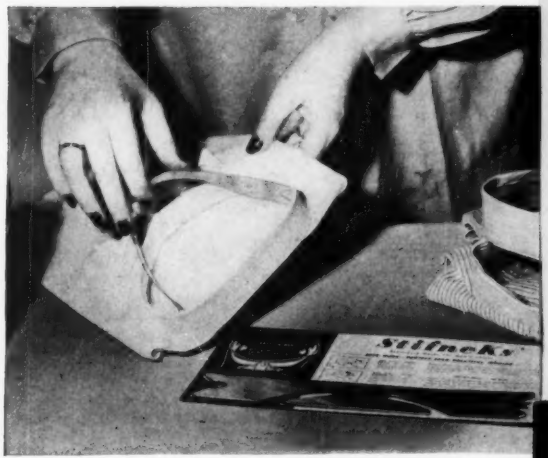
PLASTICS PRODUCTS

Above: Flexible, non-breakable 50-oz. canister molded of Bakelite polyethylene can be used for preparing or storing concentrated fruit juices or as a cocktail shaker. Air-tight, friction-fitting cover can be removed for easy filling; smaller cap, which is also air-tight, can be removed for easy pouring. Canister is made by Tupper Corp., Farnumsville, Mass.

Left: Cities Service products are promoted by giving away motor oil, penetrating oil, band instrument oils, etc., in three-quarter-ounce bottles molded in the shape of the Cities Service emblem. Bottles are molded of transparent Tenite II cellulose acetate butyrate by Thermold Corp., Clinton, N. Y., for Petroleum Advisers, Inc., 60 Wall Tower, New York 5

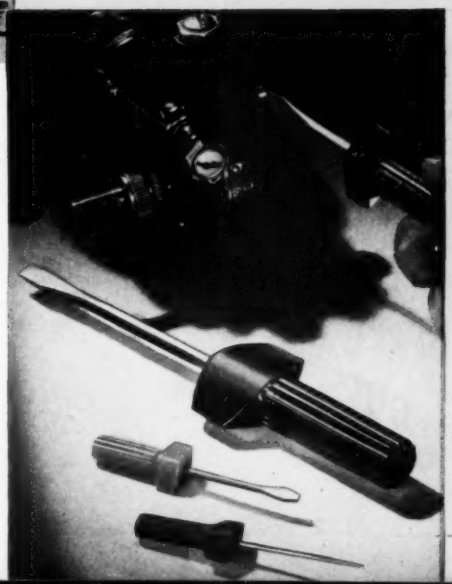
Right: Revolving receptacle for artists' tools is molded of styrene in one piece. The Roto-Tray is 10 in. in diameter and 6½ in. high and has molded-in compartments to hold ink bottles, pens, pencils, brushes, etc. Every item is in sight and easily accessible, thus avoiding frequent searches for tools in the usual table-top clutter. A felt-bottomed steel base supports a steel pylon around which the tray revolves. Molded of mahogany-color styrene by Eldon Mfg. Co., 1010 E. 62 St., Los Angeles, Calif., for Roto-Tray Div., Rapidesign, Inc., Box 551, Glendale, Calif.

Right: Book ends 5 in. high are molded of Tenite II cellulose acetate butyrate. Simplicity of the design is relieved by molded medallion. The book ends are colorful, chip-proof, easy to keep clean. Molded in black, maroon, or green with the medallion in ivory or plated in gold or silver. Produced by Sobenite, Inc., 1026 W. King, South Bend, Ind., for Plasticraft Specialties, 3222 W. Cermak, Chicago

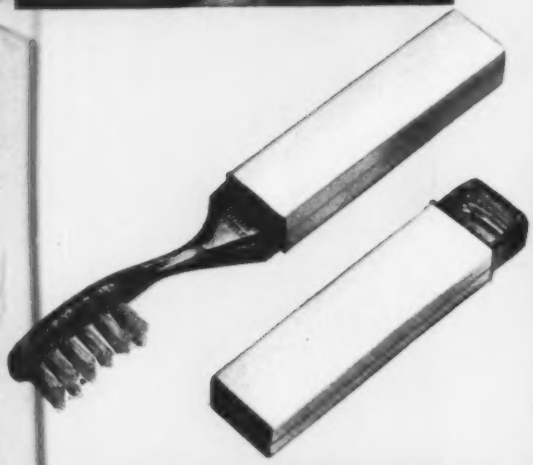


Above: Stiffeners made of transparent Vuepak cellulose acetate sheet fit inside the neckbands of freshly ironed shirts and protect them from wrinkling while in the drawer or travelling bag. They will fit in any size shirt and can be reused indefinitely. Manufactured by The Stifnek Co., Springfield, Mass.

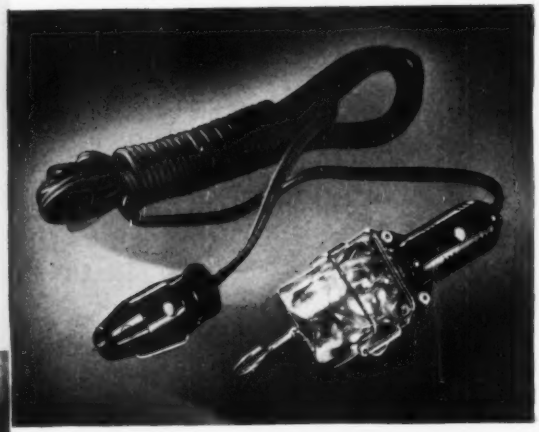
Right: Injection-molded handles of small screw drivers and stiletto have wing-like tips which give additional leverage when the work is stubborn. The handles are molded of Tenite II cellulose acetate butyrate in one piece by Martinson Tool & Die Co., Waterbury, Conn. The tools are produced by The Greist Mfg. Co., 501 Blake St., New Haven 15, Conn.



Left: Transparent Visa-Bait container weighs only 9 oz., can be clipped to the belt or carried on a strap over the shoulder. Raising the lid brings shelf up to make the bait readily accessible. Container is molded of amber or green transparent Tenite I cellulose acetate, has no metal parts to corrode. Molded by Venango Plastics, Inc., Franklin, Pa., for The Visa-Bait, Inc., 643 W. Long Ave., DuBois, Pa.



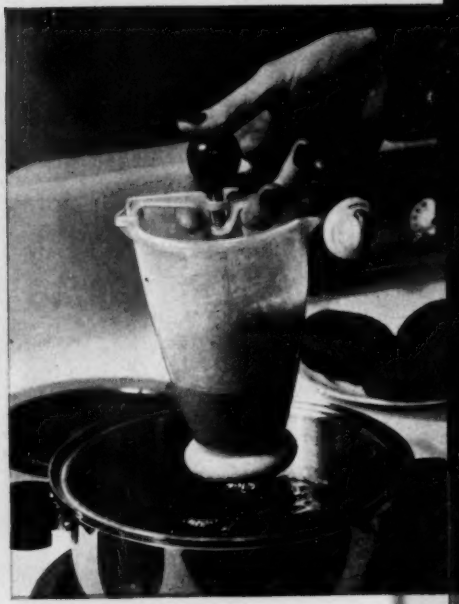
Left: Pocket-Pak toothbrush can be stored easily in purse, pocket, or travelling bag. Container which covers the brush in storage also fits over the pull-out handle to give the brush a full-size handle when in use. Lumarith cellulose acetate is used to mold both the handle and the perforated container. Made by Mavco, Inc., 14 East 38 St., New York



Above: Automobile trouble light plugs into dashboard cigarette lighter outlet, has 12 ft. of cord and a swivel hook so that it can be hung where needed. The light is handy when tires must be changed at night, for reading maps, and for lighting under the hood. Handle and plug are molded of Durez phenolic by Monowatt, Inc., 68 Bissell St., Providence, R. I.

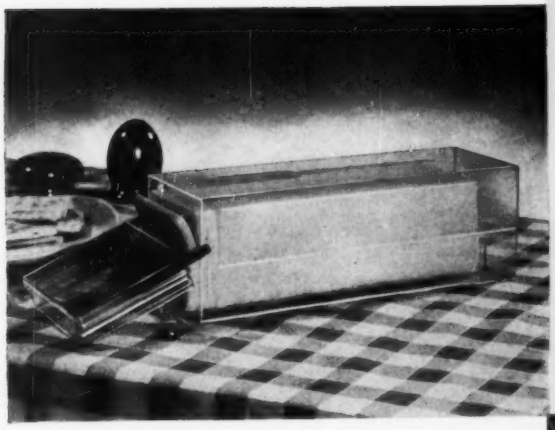
Left: Drawstring bag fabricated of Beutafilm vinyl film serves as a package for cake soap, can be reused as a refrigerator bag, knitting bag, etc. The bag is heat sealed, and the drawstrings, which are also vinyl, are heat sealed at the ends. The bag is made for Colgate's Cashmere Bouquet by The Sillcocks-Miller Co., 10 W. Parker Ave., Maplewood, N. J.

PLASTICS PRODUCTS



Right: Easy-to-use doughnut maker is molded of Lustrex styrene. Pressure on the spring-type handle releases just the right amount of batter needed for one doughnut. Manufactured by Popeil Bros., 556 W. Congress St., Chicago, Ill.

Below: Combination cheese container and slicer is molded of high heat-resistant Koppers styrene. The container is a one-piece five-sided rectangular box with a close-fitting removable cover. A 2-lb. loaf of cheese fits on a sliding tray which goes into the box. The cheese can be sliced to any thickness by sliding the tray out the necessary amount and using the edges of the container as a guide for cutting edge. Styrene parts molded by Plastic Processing Co., 2210 S. Dort Highway, Flint, Mich., for Kenneth E. Luger Co., 3017 S. Lyndale Ave., Minneapolis, Minn.



Right: Flower holder is unobtrusive because it is molded of clear Lustrex styrene. It can be used in any type of container and will hold flowers of all sizes at virtually any angle. Molded by Royal Mfg. Co., Inc., Prescott, Ariz., for Par-King Products, 1620 N. 16th St., Phoenix, Ariz.

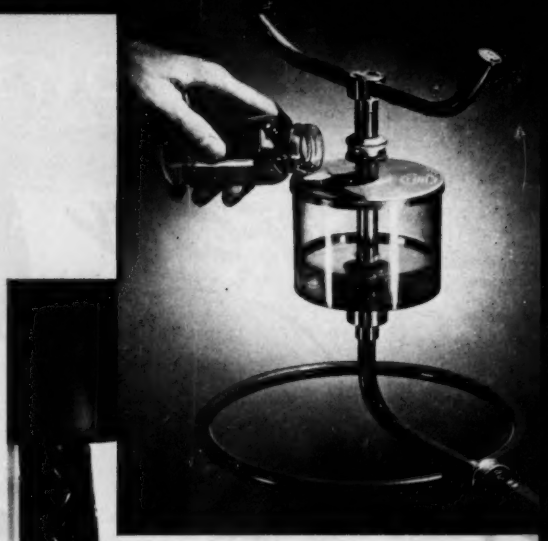
Left: Waist-high waders made of Vinylite film are lighter to wear than rubber waders; also, they fold compactly for storage or transportation. The new waders are designed for use with tennis shoes or felt-soled wading shoes, and have seamless feet made of double-weight vinyl for extra protection against rocks and other underwater hazards. Pockets inside waders keep cigarettes and matches dry. Waders are made by U. S. Fiber & Plastics Corp., Stirling, N. J.

Below: Shell Servers molded of Styron can be used for serving salad, fruit, nuts, or dessert. The four small shell dishes fit into the large one with space between them for cracked ice, or they can be used separately. Each set is in two colors and is gift packaged. Shell Servers are made by Beacon Products Corp., 82 Needham St., Newton Highlands, Mass.

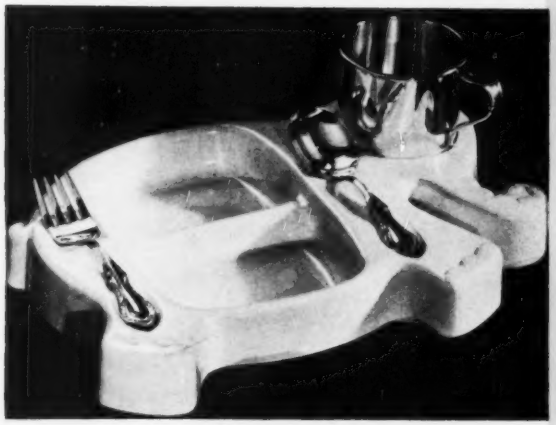
PLASTICS PRODUCTS

Left: Attractive multi-color draperies made of Lumite woven saran fabric have been installed in airport buses operated by Carey Transportation Co., New York. Herringbone pattern is used in a combination of grey, maroon, and tan. The woven saran fabric is long-wearing and easy to keep clean. It is woven by Chicopee Mfg. Corp., New York

Right: Cylindrical one-quart jar molded of transparent Tenite II cellulose acetate butyrate is attached to lawn sprinkler to ease the job of spreading fertilizer, weed killer, or insecticides. The liquid solutions, or water-soluble dry chemicals, are poured into the Tenite jar and are drawn into the stream of water by Venturi action. Rate of flow can be observed, and can be controlled by turning the lid of the jar. A hand spray can be substitued for the revolving sprinkler head. The Tenite jar is molded by Sobenite, Inc., South Bend, Ind., The sprinkler is a product of Misch Mfg. Co., 317 Capital Ave., Mishawaka, Ind.



Right: Miniature greenhouse has a brick red base and a crystal-clear removable superstructure, both molded of Lustrex styrene. Four louvered vents provide ventilation for the plants, and one section of the slanting roof opens for watering. The whole greenhouse is only 6 in. high and measures 8 by 6 in. at the base. It is manufactured by Bexley Corp., 521 W. 23 St., New York, N. Y.



Above: Baby dish molded of Koppers styrene has molded-in food compartment and depressions to hold drinking mug and silverware. The dish is molded by Boonton Molding Co., Boonton, N. J. for Fine Arts Sterling Silver Co., 12 S. 12th St., Philadelphia, Pa.

Right: Molded Durez phenolic tool for opening taped cartons is sharp enough to do the job but not sharp enough to cut fingers or damage package contents. The tool, called the Break-O-Tape, is molded in red and has spaces on handle and blade for advertising messages. Molded by Michigan Molded Plastics, Inc., Dexter, Mich., for Robert B. Huxtable Co., Lansing

SPECIFY

HOBBED CAVITIES
by MIDLAND

Home of the largest hobbing press in the plastics industry, Midland Die and Engraving is the ONE source qualified, equipped and manned to handle every Hobbed Cavity requirement—from the smallest tooth paste tube caps to radio cabinets, escutcheons and housings up to 80 square inches—nearly three times as large as ordinary hobbing limits. Typical examples of large hobbed cavities by Midland are the portable radio cabinet, radio cover and toy gunstock shown here. Midland engineering, experience and facilities are ready to serve you—ready to deliver *on time* uniform, accurate hobbed cavities at a fraction of machining costs. Specify Hobbed Cavities by Midland on *your* Bill of Materials. Or write for further information and estimates. No obligation.

MIDLAND DIE AND ENGRAVING COMPANY

1800 W. BERENICE AVENUE • CHICAGO 13, ILLINOIS

Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stamps • Hobbings • Pantograph Engraving

Phenolic-Sand Foundry Molds

Largest single use for phenolic resins is seen in development of new process for producing metal casting molds and cores

EXPERTS have estimated that a new use for phenolic resins will, in the future, consume a tonnage of resin greater than any other single application in commercial use today. The field which holds this important implication to the manufacturers of phenolics—and to the metal casting industry—is that of producing sand molds and cores which are used in foundries.

Basic work on this new process was done in Germany during World War II. First technical details for publication were obtained on April 24 and 25, 1945, when William W. McCulloch, Technical Industrial Intelligence Div., U. S. Dept. of Commerce, interviewed Johann Croning in Hamburg. The object was to obtain information on the materials and technique of the so-called "C" process of precision molding invented by Herr Croning and developed by Croning & Co. Essentially this method consists of producing a comparatively thin shell-like metal-casting mold by applying a mixture of sand and a phenolic binder to a hot metal pattern and curing the layer of material.

Mr. McCulloch's report was published on May 30, 1947, as Report No. 1168 of the Office of Technical Services, U. S. Dept. of Commerce. With this technical information available, many foundries, as well as all of the larger manufacturers of phenolic materials, have since been hard at work developing and refining the materials and technique of this newly created method of sand-mold production.

It has been announced that applications for patents applying to various aspects of this process have been made by Crown Casting Associates, Boston, Mass.

Advantages

Reports on experimental work done to date indicate that the "C" process possesses the following advantages:[1]

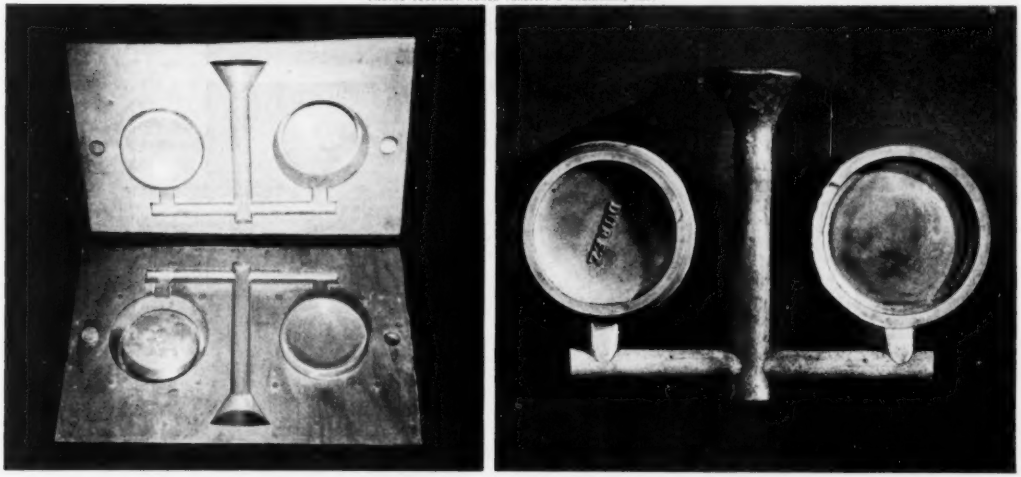
Molds are dry and porous, per-

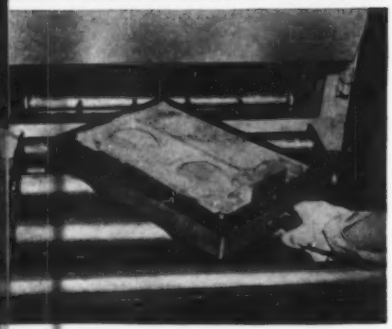
*Reg. U. S. Pat. Office

[1] Listed by courtesy of Durez Plastics & Chemicals, Inc.

Left: Shell-like sand molds have very smooth surface; they deliver castings which have exceptionally close tolerances and reproduce fine detail accurately. Right: Bronze casting as it emerges from the sand mold prior to any clean-up

PHOTOS COURTESY DUREZ PLASTICS & CHEMICALS, INC.





mitting quick elimination of gases; no back pressure is built up.

Very accurate dimensions are obtained; tolerances of a few thousandths of an inch are possible.

Sections as thin as 0.010 in. can be cast accurately.

Very smooth surfaces can be obtained on cast pieces, and considerable machining is eliminated.

Fewer surface defects and smoother surfaces result in stronger castings, allowing thinner sections.

Uniformity of resin-sand mix in molds eliminates rejects caused by variations in moisture and clay content in usual molding sand.

Cleaning of castings is minimized and shot blasting practically eliminated.

Some parts which formerly had to be made in two or more pieces to allow for machining may be made in one piece because of the reduction in the amount of machining needed.

Saving of metal by elimination of risers, by more efficient coring, etc., results in a much higher yield from metal used than customary.

Contamination of surfaces of casting is held to a minimum.

Inexpensive equipment is used in making the molds.

More molds per day can be made with the same labor and space than by usual methods.

Handling of sand is greatly reduced; only about 5% of the usual amount of sand is used.

Handling and storage of flasks are eliminated.

Unskilled labor can be used for making the precision molds.

Molds have no affinity for water and hence may be stored indefinitely.

Cores being hollow and dry allow quick escape of gases; also, they collapse readily.

More castings per unit of floor space can be poured at one time because molds are smaller and are poured in upright position.

For Casting Small Parts

Despite all of the advantages listed, present experimental work with this process indicates that it will not be economical for use in producing very large castings. Its greatest use appears to be limited to the production of relatively small parts. However, so vast is

PHOTOS COURTESY BAKELITE DIVISION

Using new mold-making process to produce a mold for two trays. At far left, from top to bottom: hot metal pattern is clamped to mold machine; pattern is placed in oven until thin layer of resin-sand mixture hardens and can be removed; two half molds are clipped together with gate vertical; molten metal is poured from electrical furnace. Left: In top picture is the pattern; lower photo, two half molds and ash-tray casting made from them

Magic Defroster...

...The Refrigerator's Guardian Angel

The Magic Defroster will defrost any electric refrigerator at any hour...for any period.

Manufacturer:
Basic Products Corporation,
Fort Wayne, Indiana

Molder:
Wayne Plastic Products
Division of
Wayne Home Equipment Co., Inc.
Fort Wayne, Indiana

...is profitably dressed in

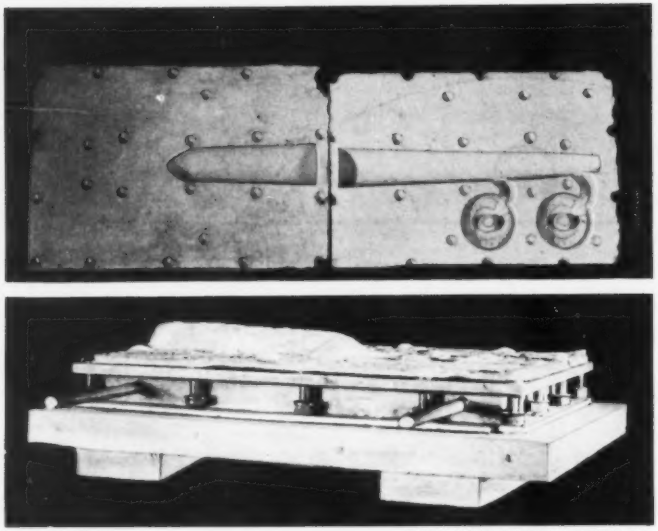
PLASKON WHITE

...not alone for its instant consumer acceptance—beauty in tone and texture—dream-kitchen permanent white that minimum care maintains. Basic Products Corporation chose Plaskon Urea White for certain special qualities, too: exceptional insulating properties, ready adaptability to wipe-in lettering techniques and economy.

Investigate the unexcelled merchandising and production merits of Plaskon Urea and Melamine *Thermosetting* Molding Compounds. Available in your colors. Literature and the counsel of our service engineers are yours for the asking.

PLASKON
MOLDED COLOR

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS CO.
2121 Sylvan Avenue • Toledo 6, Ohio
Branch Offices:
Boston, Chicago, Los Angeles, New York, Rochester, San Francisco
Manufacturers of Molding Compounds, Resin Glues, Coating Resins
In Canada: Canadian Industries, Ltd., Montreal, P. Q.



PHOTOS COURTESY BORDEN CO., CHEMICAL DIV.

Top: Opposite halves of cured sand-resin mold shells. Bottom: The cured mold shell is still affixed to heated pattern, and is ready for stripping. In partial-cure phase, a shell about 3/16 in. thick is formed in from 4 to 6 seconds. Final cure requires 3½ to 4 min. at a temperature of 500 to 550° F.

even this limited field that the large phenolic manufacturers are today spending thousands of dollars for development and promotion.

In fact, all of these companies exhibited details of this process at the 1950 Foundry Show in Cleveland. Two of them—Bakelite Div., Union Carbide & Carbon Corp., and Borden Co., Chemical Div—had actual operating exhibits where these special sand molds were produced, and metal was cast in them.

Bakelite's demonstration equipment included a dry blender for thorough mixing of the resin and sand, a cast-iron pattern which was used for producing the half molds, a mold machine for application of the resin and sand mixture to the hot pattern, an oven for heating the pattern and curing the molds, a strip table for removing the finished mold from the pattern, and an electrical furnace for melting and pouring the silicon alloy of aluminum.

In producing molds with this equipment at the Foundry Show the operator clamped the heated metal pattern to the top of the mold machine which contained a quantity of the resin-sand mixture. This mold machine was mounted so that it could be inverted, thereby causing the resin-sand mixture to fall onto the surface of the heated pattern. After sufficient time elapsed to permit a suitable thickness of resin-sand material to fuse together on the hot mold surface, the mold machine was returned to its upright position and the remaining loose resin-sand mixture fell to the bottom. The clamps were then loosened, and the hot pattern with the shell-type sand mold adhering to it was removed and placed in an oven. The pattern and mold remained in the oven until the resin-sand mixture hardened, after which the thin mold was removed from the pattern. Two halves of the mold produced in this manner were clamped together.

The parts of the mold were held tightly and uniformly in position by placing the clamped mold in a mold box with the gate uppermost. Metal shot was then poured into the mold box, outside the mold, to maintain the mold halves in alinement and to facilitate dispersion of the heat given off by the molten metal poured into the mold from the furnace. Sufficient metal shot was used to fill the mold box almost to the top of the mold. The photographs on page 80 show the method and equipment used at the Bakelite exhibit at the Foundry Show.

Specific Recommendations

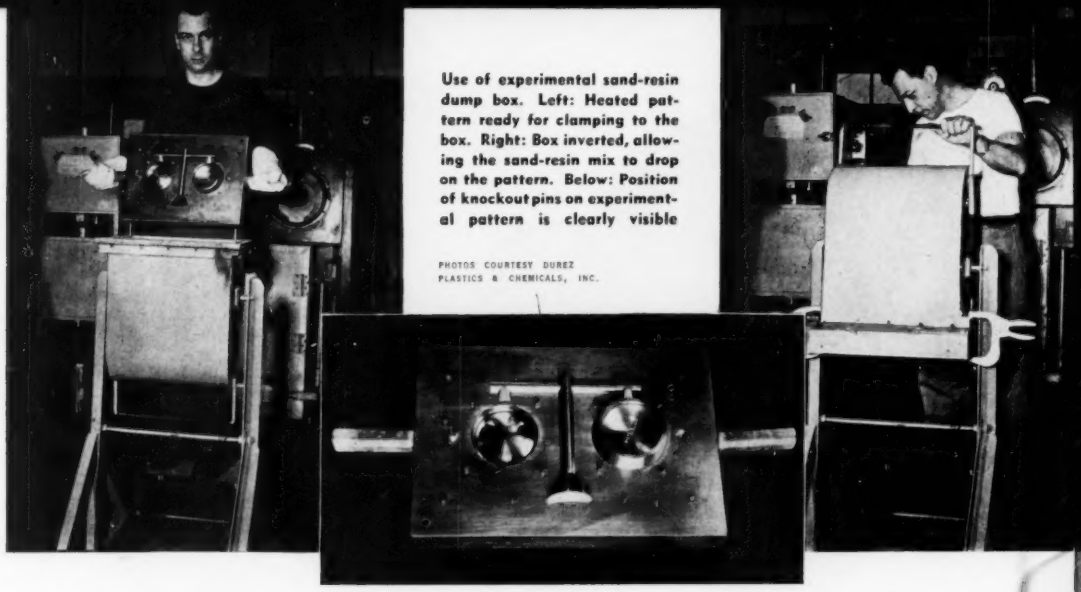
The development work on the part of phenolic producers has led to a number of engineering reports which are essentially recommendations for procedure. The remainder of this article is in the nature of separate reports based on information supplied by Borden Co., Chemical Div.; Durez Plastics & Chemicals, Inc.; and Monsanto Chemical Co. The techniques thus far developed, as reported here, are basically similar; however, they are presented at some length, despite apparent repetition, because of significant and important differences in detail.

The Borden procedure involves the use of heated metal patterns containing sprues, runners, and gates. The pattern, heated to 400 to 450° F., is secured to one end of a resin-sand reservoir and the entire assembly inverted. The mixture of resin and sand falls against the pattern, the heat from which causes the resin to flow momentarily and then partially cure around the sand next to the pattern. A shell structure approximately 3/16 in. thick is formed within 4 to 6 seconds. At the end of this time the assembly is returned to the upright position, permitting loose and uncured resin-sand mixture to fall away from the shell. This unused mixture is then ready for making the next mold.

Curing the Shell

The pattern with the partially cured shell attached is immediately placed in an oven for the final cure at 500 to 550° F. Curing requires 3½ to 4 minutes. The mold is now ready for use or can be stored indefinitely.

Borden Co. recommends Thor Resins MCF-221, MCF-251, and MCF-278, which have been specifically formulated for this application. According to Borden, these resins differ primarily in speed of cure and are characterized by good workability; they mix readily with sand. Cure takes place rapidly at temperatures below 550° F.; sand grains are bonded with the desired strength, retaining excellent permeability and imparting good sur-



Use of experimental sand-resin dump box. Left: Heated pattern ready for clamping to the box. Right: Box inverted, allowing the sand-resin mix to drop on the pattern. Below: Position of knockout pins on experimental pattern is clearly visible

PHOTOS COURTESY DUREZ PLASTICS & CHEMICALS, INC.

face smoothness, outstanding definition, and trueness to pattern.

Borden also states that dimensional stability of cured mold surfaces can be relied upon. The application efficiency of these resins is such that it is seldom necessary to use a concentration of binder in excess of 8% by weight of the sand.

The sand should be washed and dried silica sand, free of clay, metal oxides, and organic matter. It should be of an AFS fineness ranging between 110 and 140. No water is used.

Mixing should be thorough to accomplish complete dispersion of resin throughout the sand. Conventional mulling equipment, paddle mixers, counter-rotating ribbon mixers, and tumblers are considered satisfactory.

The present experience of Borden indicates that aluminum and polished gray iron make the best pattern materials because of the ease with which the cured face strips from them.

The most effective release agents found to date are the Dow-Corning silicones. A suggested proportion is 10% of DC-7 dissolved in carbon tetrachloride. Other release agents are being investigated and work is under way to develop new parting materials.

Borden is still concentrating its efforts on experimental work in connection with the "C" process, and especially on the phenolic formulations. Although this work is not yet complete, it has become apparent that different phenolic formulations will probably be required for molds for casting different metals.

Cast Iron Patterns

In the recommendations made by Durez Plastics & Chemicals, Inc., for satisfactory operation of the "C" process, it is suggested that the pattern should be made of cast iron with a smooth finish. It should be hollow with a uniform section of about 9/16 inch. The plate on which the pattern is mounted should also be of cast iron with a uniform 9/16 in. thickness. The plate should contain knock-out pins, preferably mounted on a push plate for removal of the cured mold. A very smooth surface on the plate is important for easy removal of the mold. The uniform thickness of metal is necessary for uniform heating and conducting heat to the resin-sand mix in order to build up a mold of uniform thickness. Gates and runners should be mounted permanently along with the half pattern on the plate.

It is necessary to lubricate the patterns to prevent sticking of the resin-sand mold. Durez recommends a dilute solution of silicone mold-release fluid. This should be sprayed on the cold pattern and then applied to the hot pattern at intervals as may be necessary. A satisfactory product packed in a convenient spray can is Bomb-Lube Mold Lubricant, made by Price-Driscoll Corp., New York 17, N. Y.

A conventional muller-type foundry mixer may be used to mix the sand and resin, but a tumbling-type mixer is preferred since it has less tendency to break down the sand.

The dump box for holding the resin-sand mixture and bringing it into contact with the hot metal pattern should be arranged for quick inversion. Durez has found that the box should be big enough to hold 40 to 80 lb. of the mix and have sufficient head space to allow the mix to fall about one foot before contacting the pattern. The weight of the mix and the effect of the fall insure good contact with the hot metal pattern.

A gas fired oven is desirable for quick heating of patterns. It should be large enough to hold several patterns of the largest size that will be used. It must be capable of maintaining a uniform temperature of 650° F. and have suitable temperature control adjustments. Baffles in the bottom are desirable to prevent over-heating of any part of the plate or pattern.

Satisfactory Resins

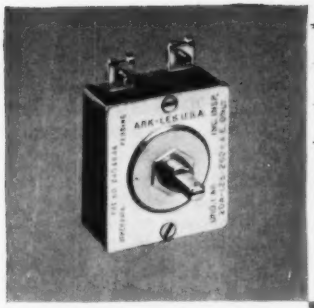
Several types of satisfactory powdered resins are available, and choice depends on the type of mold

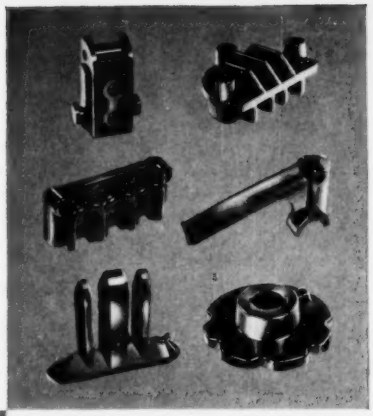
(*Continued on p. 86*)

Stay on the extra safe side

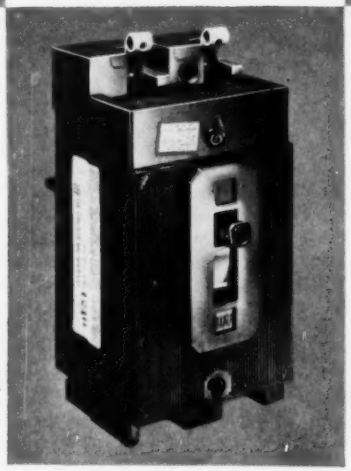
Consider how electrical parts and products are made safer, more efficient and more enduring by the use of MELMAC plastics.

From a safety standpoint alone, the exceptional arc resistance and non-tracking properties of MELMAC 1500 and 1502 are a great advantage. They minimize hazards from short circuits and fire when sudden surges take place within a confined area where terminals must be close together.



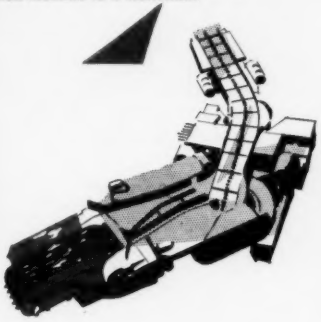


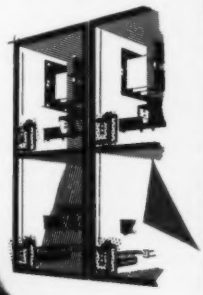
MELMAC plastic 1502 in the Ark-Les Electric Range Switch greatly reduces danger of switch fires from short circuits. Any arcing tends to burn off food or grease without damage to the plastic. (Molded by T. F. Butterfield, Inc.)



This I-T-E Circuit Breaker is given high arc resistance through the use of MELMAC 1500 for the part that must stand the most gaff . . . the base section of the breaker. (Molded by Kuhn and Jacob Molding & Tool Co.)

For *safety's sake* . . . shock- and arc-resistant MELMAC plastic is used for most of the electrical insulating parts in the Joy Continuous Miner. As a result, danger of fires from short circuits hundreds of feet below ground has been reduced to a minimum.





with MELMAC® Plastics

These MELMAC compounds are highly resistant to carbonizing under arcing, wet or dry... they insure electrical insulation... and are self-extinguishing.*

All these factors add up to more safety, longer life, greater economy in electrical parts.

Call on us for design, technical, or sales help on any of your product-improvement ideas. The tougher the problem—the more help we may be able to offer!

*ASTM method D635-44

AMERICAN Cyanamid COMPANY
PLASTICS DEPARTMENT
32 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

In Canada: NORTH AMERICAN CYANAMID LIMITED
Royal Bank Building, Toronto, Ontario, Canada

and the metal to be poured into it. This can best be determined by trial. A wetting agent helps to make a more uniform mix. Such an agent also prevents segregation of sand and resin as the mix is handled and used. A special wetting agent that mixes easily and gives optimum results in this phase of the operation has been developed by Durez.

The sand should be free of clay, metal oxides, moisture, organic matter, and findings. Round sand of uniform particle size is preferable. In general, fine sands such as 155-AFA can be used for bronze and aluminum; coarser sand such as 90- to 100-AFA is preferable for steel as this gives greater porosity for quicker elimination of gases. Finish can be improved by adding small percentages of certain finely ground inorganic fillers, but too much will reduce porosity. The proportions of sand and resin are dependent on results desired. Higher resin content will produce a smoother and more accurate mold and casting.

Mold Making

In making molds, the resin-sand mix is prepared by mixing 100 lb. of sand with ¼ lb. of Durez wetting agent, preferably in a tumbling-type mixer, for 3 minutes. From 6 to 10 lb. of Durez powdered resin is then added and mixed thoroughly (2 to 3 minutes). Mix must be free flowing and free from lumps.

The pattern plate is placed in the oven at 650° F. until it has reached 550° F.; approximately 2 to 3 min. should be sufficient for this step.

The pattern plate is clamped on top of the dump box. The box is then inverted quickly, and the mix is allowed to contact the hot pattern until a desired mold thickness is built up. The longer the contact the greater the thickness. A thickness of about ⅛ in. is generally satisfactory, Durez reports. If the pattern is hot enough, this should build up in 3 to 6 seconds. The resin fluxes from the heat of the pattern and bonds the sand, but is not thoroughly cured until the pattern plate with mold attached is placed in an oven at 650° F. for 2 to 3 minutes. The time in the oven must be sufficient to cure the resin and also to raise the pattern to the original temperature. If the pattern is not hot enough, the build-up of mold on pattern in the next cycle will not be as thick for same period of inverted dump box time. Durez indicates that it is preferable to undercure molds for use on steel and overcure those for use on bronze and aluminum for proper breakdown of the resin when the castings are poured.

The two halves of the mold must be held together during the pouring of the metal. Cores are assembled in the mold in the usual way. By proper design they can be used to assure accurate alinement of the two mold halves because of the accuracy of both mold and core when made by this method. For casting aluminum, merely clamping the two halves together is generally satisfactory. For heavier metals, the two halves are placed in a box surrounded by steel shot.

Pouring Metal

The mold is poured in an upright position, contrary to usual foundry practice. Air and gases escape readily through the mold and, of course, no troublesome moisture is given off by the mold. Care should be taken to avoid turbulence of the metal during the pouring, as too much turbulence may remove some of the sand from the mold surface. The quick escape of air and gases eliminates any possibility of back pressure and results in a solid, dense structure comparatively free from porosity and defects. It is generally better to pour metal on the low side of the usual temperature range.

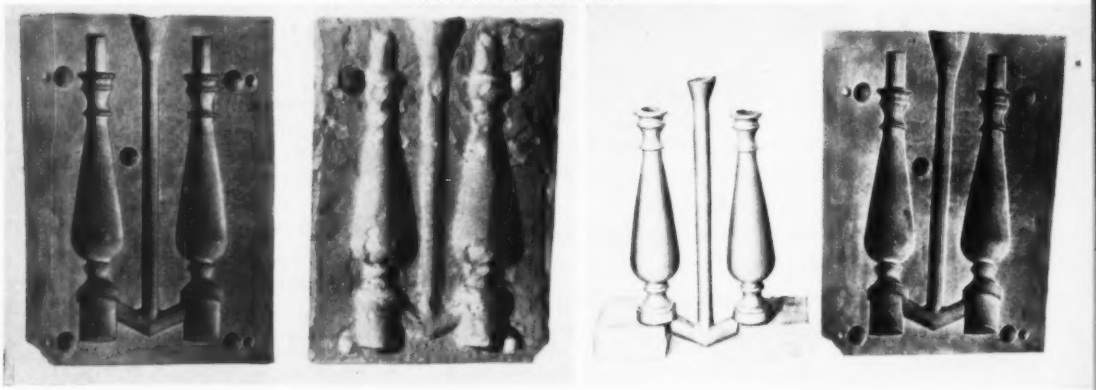
Large Volume Castings

Monsanto Chemical Co., sees the "C" process as especially adaptable to high-volume, small-size casting production where a large quantity of different patterns will not be required. A steel pattern is recommended for long runs, especially if close tolerances are required on the cast parts. Cored patterns will be satisfactory for some parts, although it is necessary to design such patterns carefully in order to get uniform heat transfer. One possible difficulty with thin-cored patterns is that close tolerances may be difficult to hold in the pattern. In Monsanto's experimental work, it has become apparent that a new "shrink-

(*Continued on p. 156*)

Steps in casting candlesticks with new process. From left to right: molding surface of sand-resin mold; back or outer surface; cast metal candlesticks just out of mold, complete with runners and riser still affixed; metal pattern

PHOTOS COURTESY MONSANTO CHEMICAL CO.



How to Extrude, Orient, Anneal, Wind

Polyethylene Monofilaments

by W. H. Willert*

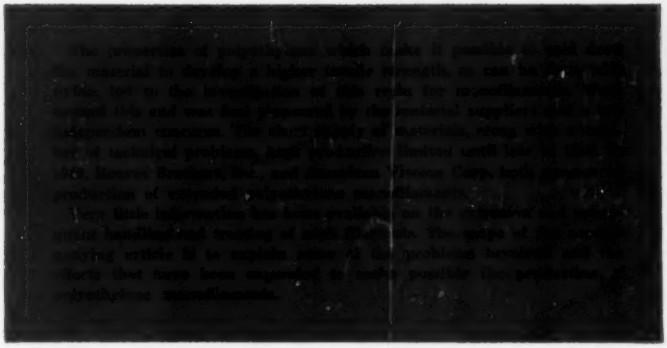
IN brief, the process for extruding polyethylene monofilaments consists of blending the resin and colorant to obtain the desired shade, compounding to put the resin in an extrudable form, and extruding into strands. The extruded filaments are then cooled, stretched to increase tensile strength, annealed to obtain thermal stabilization, and wound onto spools for the convenience of the weaver or converter. The flow sheet in Fig. 1 shows the two most conventional procedures used.

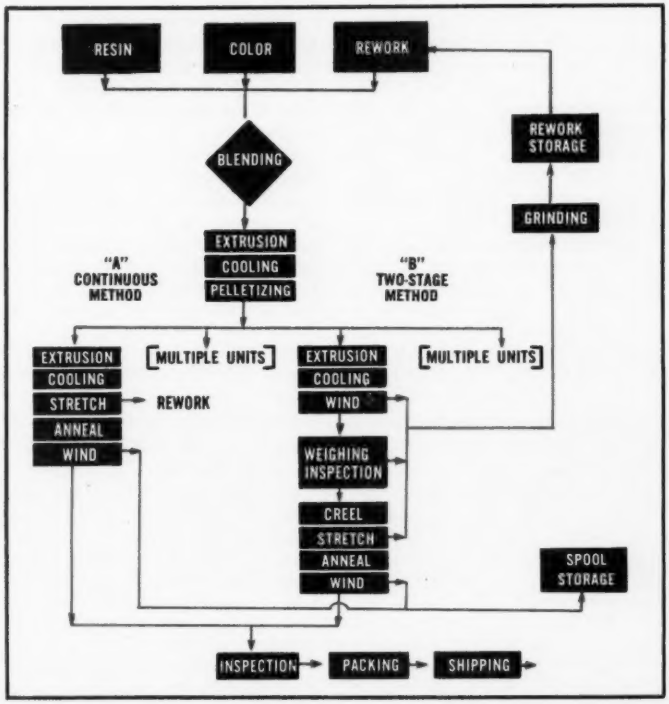
Raw Materials

The raw materials used in monofilament extrusion consist of the resin and the colorants. The extrusion material can be purchased already colored but the possibility of utilizing scrap or reworkable material usually makes it more economical for the extruder to do his own compounding. In addition, compounding in the extrusion plant gives the operating flexibility of stocking the natural resin in advance and making up color batches at will. The resin is usually supplied in cube form in 50-lb. bags. The higher molecular-weight resin, running into the 20,000 to 22,000 range, is usually preferred for monofilament extrusion.

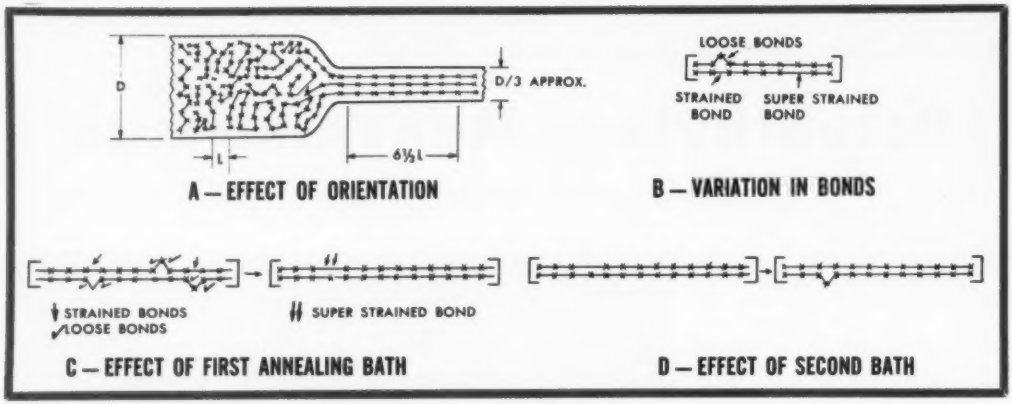
The colorants most satisfactory are the insoluble-type pigments and lakes that are heat stable to 600° F. as well as light stable. The types which have proved most satisfactory are the permanent 2B (red); cadmium selenide light reds and oranges; cadmium yellows—golden and primrose; phthalocyanine greens and blues; titanium dioxide or zinc oxide for whites and opaquing agents; and carbon blacks. Calcined iron oxides, siennas, and umbers for tints will provide a wide color range. The colors can be obtained as raw pigments, in powder form, or, preferably, as master-batches of pigments predispersed in resin. In the

*Hartig Engine and Machine Co., Hillside, N. J.





1—Flow sheet of two methods used for extruding polyethylene monofilaments. The difference between the two methods is in the handling of the extruded and cooled filaments after they leave the cooling water bath



2—How molecules are rearranged during orientation of polyethylene monofilaments, with resulting variations in the molecular bonds. Two annealing baths under controlled shrinkage conditions will relax super strained bonds

latter case, the plasticity of the master-batch must be greater than that of the resin in which it is to be used.

Compounding

The virgin resin, color or master-batch, and (if used) the ground rework are blended in a mechanical mixer. This mixture is fed to an extruder which melts the resins, further disperses the pigments, and removes all foreign materials as the compound passes through the screens and strainer plate. A screen pack consisting of several 150-mesh screens is normally used.

When dry pigments are used, the temperatures are kept low so that the material is worked to a greater extent and maximum dispersion is achieved. Higher temperatures are used with the master-batches because only melting of the resin is required for maximum dispersion. In almost all cases, the master-batches give the highest color values and the best results.

The molten resin is now forced through a forming die into multiple rods, which are drawn into a water bath at a temperature of about 160° F. From here, the rods go to a chopping or pelletizing unit which cuts the ⅛-in. diameter rods into pieces about ⅛ in. long. Banburys, roll mills, and other conventional mixing methods can be substituted for the above operation.

The next operation is the extrusion of the compounded resin into filaments. The most suitable extruder is one with a 2-in. bore and with an extrusion capacity up to about 50 lb. per hour. The extrusion rate and temperatures are regulated to melt thoroughly the resin and destroy any crystalline or oriented molecular structure that might exist in the feed resin. Temperatures range from cooling at the hopper to 300 to 550° F. on the cylinder zone next to the hopper to 400 to 600° F. on the die.

The number of orifices and their diameter depend upon the size of the filaments to be produced and the capacity of the machine. The relationship of the diameter of the orifices to that of the strand before later cold stretching should be such that a pull down of at least 5% in cross sectional area, but not more than 15%, is required at the extruder. The reason for this is given under "Orientation" below. The length of the lands of the orifices should be such that it is several times the diameter.

A breaker plate and a screen pack should be inserted ahead of the die. The screens will remove any foreign material or undispersed pigment which might clog the die orifices or cause poor orienting; 150 mesh screens have proved to be of sufficient fineness.

The filaments are extruded downward from the die into a water bath. The distance from the water to the die, the temperature of the water, and the length of the bath depend upon the capacity of the machine and the number and diameter of the strands. If the strands are cooled too rapidly, the outer surface shrinks faster than the interior, causing voids or weak spots which would result in poor orientation. A distance of 3 in. from the die to the water and a travel of 6 ft. in a bath ranging in temperature from 80 to 125° F. have proved satisfactory for a strand traveling up to 30 ft. per min. and of a size that is finally finished as a 12-mil filament. The same length bath can be used for larger diameter filament, but the rate of travel through the bath must be reduced.

A constant speed take-up is located at the end of the water bath to draw the filaments at a uniform rate; the diameter of the filaments is maintained by varying the extrusion rate. To produce filaments of a different size, the speed of the take-up, the size of the orifices, and the extrusion rate all have to be changed.

Handling the Filaments

There are two methods of handling the extruded material as it leaves the cooling tank. These methods are shown diagramatically in Fig. 1. In the continuous method, the filaments are immediately oriented, annealed, and wound on spools ready for shipping. In the other or two-stage method, the unstretched strands are wound on spools at a very low tension, and the

rest of the process is made a separate and independent operation.

The continuous method requires less floor space and has the added advantage that less handling is required and that the finished product is obtained almost immediately after it is extruded. Should extrusion conditions change, should dirt or foreign material get into the strands due to a misplaced or clogged screen, should poor color dispersion be obtained or should any other trouble develop, it can be detected immediately from the stretching characteristics and corrected. On the other hand, the only production control possible is to measure the diameter of the filaments. The other main disadvantage is that the whole operation must be interrupted if tangling and snarling of the yarn occurs in the course of the orienting, annealing, or winding operation.

The greatest advantage of the two-stage process is that the extrusion rate is not limited by the orientation capacity. A number of orientation and annealing units can be used to handle the output of one extruder. Also, the units can be stopped and started at will, without affecting the extruder output, to correct snarls, to tie knots, etc. Because no breaks occur in the extrusion operation, the weight of filament on each spool can be used for a yardage control. The extra handling, greater floor space required, and the difficulty of detecting until later any changes in extrusion conditions that affect the stretch qualities, are a few of the disadvantages of the two-stage process.

The choice between the two methods depends largely upon the size filament to be produced and the size extruders to be used. For a 2-in. extruder, the continuous method is more economical for filaments down to 12 mils, and the two-stage method for those smaller in diameter. It is inadvisable to use an extruder smaller than 2 in. in bore because of low production rate and difficulty in feeding.

COURTESY REEVES BROS., INC.

Durable, easily cleaned seat covers of polyethylene monofilaments

Orientation

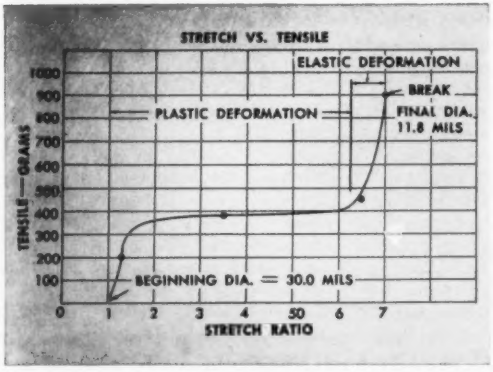
In the process of orientation, the extruded filaments are cold stretched to produce increased tensile strength and to reduce elongation. In this operation the material is changed from an amphorous form, where the molecules are not in any particular arrangement, to a crystalline structure, where they have a definite relationship to one another—as illustrated in simplified form by the "Xs" in sketch A, Fig. 2. The lines between the "Xs" represent the molecular bonds. The amount of stretch that can be obtained depends upon the extrusion heats, hot stretch or pull-down between the die and the water bath, molecular weight of the resin, pigment dispersion, and loading. Figure 3 shows how tensile strength increases as the strands are elongated. The strands should be stretched sufficiently to remove all residual elongation and to start on the elastic elongation phase. This insures that the filaments become fully oriented. The orientation can be accomplished by the use of a pair of rolls running at different speeds.

The speed of orienting the filaments is limited only by the rate at which the material can be handled. Heat is generated in the strands as they are stretched. Slight warming of the strands or taking them from the water bath after the extruder at temperatures around 160° F. reduces the amount of tension required to stretch them. Poor color dispersion or foreign materials in the strands reduce the efficiency of this operation by causing breaks in the filaments.

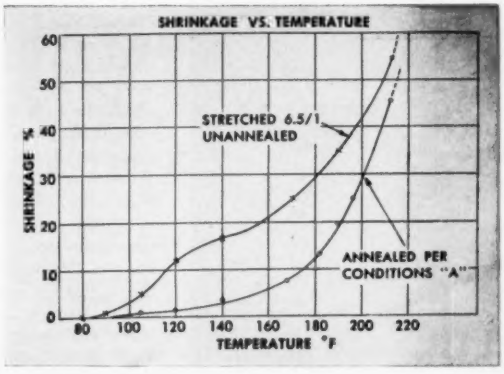
Annealing

When the filaments are oriented, perfect alinement of the molecules is not obtained; rather, some of the bonds are loose or under strain. Some of the combinations that can result are shown in B, Fig. 2. Be-

3—Tensile strength development in polyethylene monofilament by stretching to remove all residual elongation



4—Shrinkage-temperature curves of two oriented monofilaments, one unannealed (upper curve) and one annealed



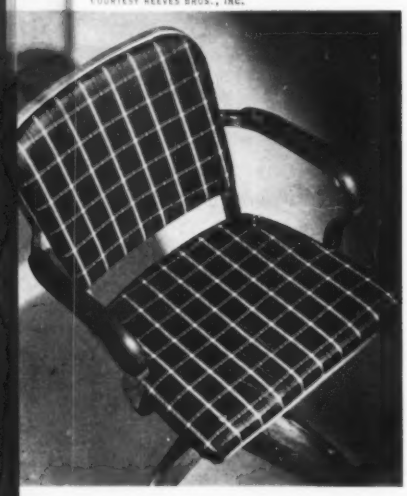
cause of these imperfections the filaments have internal strains which give rise to a tendency to shrink when subjected to heat. To thermally stabilize the filaments, they are subjected to an annealing process following stretching. To keep the highest level of orientation and tensile strength, the stretched filaments are first passed through a bath at a temperature just under the yield temperature or softening point of the resin, between 195 and 200° F. In this bath, the filaments are prevented from shrinking by a pair of rolls running at the same speed; this theoretically lets some of the bonds slip as in C, Fig. 2.

The first annealing bath is followed by a second one at a slightly lower temperature. Here the filments are allowed to shrink a predetermined amount under the control of differential rolls. This bath relaxes the tight or strained bond, as shown in D, Fig. 2. The amount of shrinkage allowed depends upon the tensile strength, elongation, and thermal stability desired in the finished filaments. The more shrinkage allowed in this bath, the lower will be the tensile strength, the greater will be the elongation, and the higher will be the level of heat stability. This bath is usually operated at about 190° F.

The length of the baths or the total immersion time depends upon the diameter of the filaments and the speed at which they are traveling. An immersion of about 2 sec. in each bath for 12-mil filaments is sufficient for proper annealing. Additional time has been found to result in little advantage.

After two years of use, Reevon polyethylene fabric shows no wear

COURTESY REEVES BROS., INC.



General Conditions

The conditions for orientation and annealing are closely related. The results which may be expected by changing certain conditions can be demonstrated by two examples, tabulated in Table I. Both sample monofilaments will have about the same average tensile, elongation, and shrinkage, but the filament treated under condition "A" will be more uniform. Filament "B" may contain slubs (unoriented sections) resulting in diameter variations and non-uniform shrinkage characteristics. In all cases the orientation should be kept at a maximum to insure uniformity. The above sample filaments should be stable to 120° F. with a maximum shrinkage of 8% at 165° F. and a tensile strength of 18,000 p.s.i. for 21,000 to 22,000 molecular-weight resin in a 12-mil filament. By increasing or lowering the shrinkage allowed in the second bath, the properties can be varied as described above. Figure 4 shows the effect of annealing a 12-mil filament per condition "A", Table I.

Winding

Winding tensions should be held to a minimum so as not to stretch the yarn. To accomplish this, tension of approximately 500 p.s.i. should be used, or about 32 gm. on a 12-mil filament. However, if the tension is too low, "soft" spools will result which makes the yarn difficult to remove. The size of the spools should be selected in proportion to the diameter of the yarn to which they are to be used, so the pull-off tensions in the warping and beaming operations in weaving do not exceed the above amount.

Weaving and Finishing

In the weaving of polyethylene monofilaments, no particular difficulties are encountered. A few minor changes should be made on the loom such as providing the take-up rolls with a special friction covering to prevent slippage and the use of a good grade of fur in the shuttles to stop the yarn from sloughing off the quills. Because the material is naturally flexible, the quills do not have to be heated as is often done when weaving other plastic monofilaments.

Finishing consists of calendering cold to set the position of the filaments in the pattern. This is followed by further heat treating or annealing in a heated water bath or air to stabilize the fabric against shrinkage. By this method it is possible to obtain a fabric with less than 1% shrinkage at 165° F. A light finishing calendar is required to produce a smooth finished piece of non-moisture absorbing, wear-resistant, light-stable, attractive fabric suitable for upholstery, luggage applications, and other special uses.

aid to gardeners

Red Circle 4-in-1 Lawn Sprinkler with Tenite injector jar made by Misch Manufacturing Co., Mishawaka, Ind. Tenite jar molded by Sobenite, Inc., South Bend, Ind.

A TENITE jar attached to a lawn sprinkler eases the chore of applying fertilizers, insecticides, or weed killers to lawns and gardens. Placed in the plastic container, liquid or water-soluble preparations feed in exactly controlled amounts into the stream of water flowing through the sprinkler. Thorough distribution is accomplished by the rotating sprinkler head, or by a hand spray substituted for the sprinkler head.

Tough Tenite makes this application virtually unbreakable and provides shatterproof transparency. Its resistance to moisture and weather is excellent.

This sprinkler jar is one of many Tenite products for gardening. Others include colorful, pleasant-to-touch garden-tool handles, transparent plant protectors which speed the maturity of vegetables and fruits, and nonsplintering lawn-mower rollers and other mower parts. For more information about Tenite and its uses, write TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

TENITE

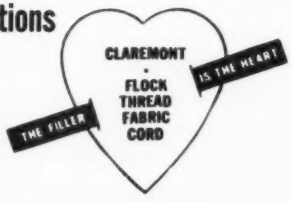
an Eastman plastic

● Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N.Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.

Within each piece, the muscle-strength of **CLAREMONT COTTON FILLERS**

CLAREMONT Cotton Fillers Steel Thermosetting Formulations Against Shock and Breakage

Of all the muscle-building ingredients used by plastics materials manufacturers to develop specification-toughness, Claremont Cotton Fillers have proven most satisfactory! When quality, uniformity and faultless mixing are the foremost considerations, suppliers and material-compounding molders use one or more of Claremont's four graduated-strength types of fillers (flock, thread, fabric or cord). Many, many millions of pounds of Claremont Fillers have already done their share to make many millions of plastic parts functionally strong!



INQUIRIES INVITED . . . Claremont Fillers in neutral, black or color, and in quantities sufficient for your laboratory test runs, are available upon request. Write today for complete details.

CLAREMONT
WASTE MANUFACTURING CO.
"The Country's Largest Manufacturer of Flock" CLAREMONT, N. H.

Dielectric Fatigue of Thermoset Laminates

by NORMAN A. SKOW† AND C. A. BELSTERLING††

Dielectric fatigue tests were run on each of several grades of thermosetting plastic laminates. Breakdown voltage was plotted against time. The data obtained indicate that for a given temperature, thickness, and conditioning, a limiting voltage exists below which fatigue will not occur for an indefinite period of time. Tests of this type yield results which are helpful in the design of insulating components for electrical equipment.

THE three factors entering into consideration of a material as a dielectric are dielectric strength, dielectric loss, and insulation resistance. Of these, perhaps dielectric strength is the more important, because it depends on many other factors such as temperature, moisture resistance, thermal aging, and mechanical wear.

Experience has shown that thermosetting laminates are highly desirable as insulating parts. This is due to their unusual combination of properties which include mechanical strength, electrical insulation, moisture resistance, chemical resistance, thermal endurance, resistance to aging, wear resistance, lightness in weight, and ease of fabrication. Although a great deal of data has been published on the electrical properties of high pressure laminates, very little literature is available on their fatigue properties.

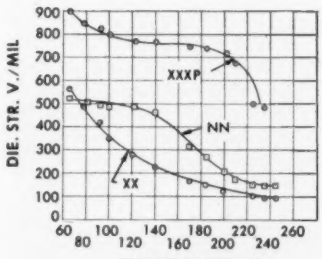
*Reg. U. S. Pat. Office.
† Director of Research, Synthane Corp., Pa.
††Electrical Engineer, Synthane Corp., Pa.

The dielectric strength[1] of an insulating material is the maximum potential gradient that the material can withstand without rupture. It is calculated from the breakdown voltage and the thickness of the specimen and is commonly expressed in volts per mil. The value obtained in a test will depend upon the method and conditions of tests and, in general, will vary with temperature, thickness, conditioning treatment of the specimen, and with the duration of the test.

For quick determination of dielectric strength, the short-time test has been devised. For fairly rapid determinations, but laying more emphasis on the time factor, the step-by-step test has been arranged. Tests involving short exposures are primarily comparative and not indicative of the breakdown of the materials under prolonged exposure to lower stresses. The limitations of these tests have already been pointed out in the appendix to the A.S.T.M. Standards on Electrical Insulating Materials.[2]

Most dielectric strength measurements are taken perpendicular to the laminations, and standards are usually set up on this basis. However, many applications involve electrical stresses in a direction parallel to laminations, and standard test methods are available for making measurements in this direction. These tests indicate that thermosetting laminates have lower dielectric strength parallel to laminations than perpendicular to lami-

[1]A.S.T.M. D 149-44.



1—Effect of temperature on short-time dielectric strength of 1/16-in.-thick laminates tested dry

[2] Published by American Society for Testing Materials, 1916 Race St., Phila., Pa.

Table I.—Effect of Temperature on Dielectric Strength (Short Time) of Laminates

Temperature	*Dielectric strength (short time)*[a]		
	Grade XX	*Grade XXXP*	*Grade NN*
°F.	v./mil	v./mil	v./mil
65	568	900	520
77	484	850	498
91	416	825	486
100	339	800	483
121	282	775	480
139	240	778	455
170	160	750	317
184	138	743	275
202	120	719	213
210	103	675	170
225	99	500	155
236	87	490	145
244	86	.....	140
256	82	.....	134

[a] Average for five specimens, 1/16 in. in thickness, conditioned for 1 hr. at 220° F.

Table II.—Effect of Thickness on Dielectric Strength (Short Time) of Grade XX Laminate

Thickness	Observed dielectric strength (short time)[a]	N.E.M.A. dielectric strength (short time)	
		minimum	average
in.	v./mil	v./mil	v./mil
1/32	940	700	950
1/16	695	500	700
1/8	515	360	500

[a] Average for five specimens conditioned for 1 hr. at 220° F. and tested at 73° F.

nations. This investigation is limited to a study of the breakdown voltages of certain grades of laminates perpendicular to laminations. It is like earlier work on molding materials by Shuster and Telfair.[3]

Long-time service is expected of the laminates which are used in electrical applications. Therefore, it seemed pertinent to determine the fatigue characteristics of these products. An analysis of the effects of temperature, thickness, humidity, and time will determine the safety factor to be used in designing insulation for electrical equipment.

Experimental

The six standard N.E.M.A. grades[4] of laminated thermosetting products tested were: X, XX, XXXP, LE, A, and G-5. In addition to these standard grades, a nylon fabric base (grade NN) was also investigated.

Dielectric measurements were made on grades XX, XXXP, and NN at various temperatures keeping thickness and conditioning of samples constant. These tests were made in oil on specimens 6 by 6 in. in accordance with A.S.T.M. D 149-44. Table I shows the average short-time dielectric strength for temperatures from 65° to 256° F.

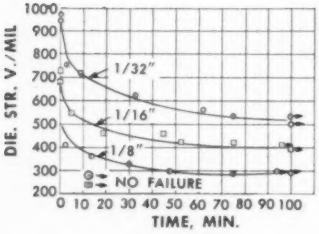
The data are shown graphically in Fig. 1. These curves indicate that as the temperature of the laminate increases the dielectric strength decreases. They also show that some grades do not decrease in dielectric strength as rapidly as others. For example, grade XXXP decreases very slowly between 80° and 200° F. This is a great advantage in applications such as electronic equipment where the component parts operate at elevated temperatures. In order to eliminate the effect of temperature in other tests of this series, all subsequent tests were made at a standard 73° F.

Although the knowledge of variations of dielectric strength (short time) with thickness is well established, it was confirmed while determining the dielectric fatigue strength of grade XX for three different thicknesses. The samples were tested at 73° F. after conditioning 1 hr. at 220° F., followed by cooling in a desiccator. The data are shown in Table II along with values published by the National Electrical Manufacturers Association. The results indicated that thickness should be kept constant for the fatigue tests. A thickness of 1/16 in. was selected for all test specimens for the remaining investigation. This thickness was selected because it is a representative thickness used in electrical applications.

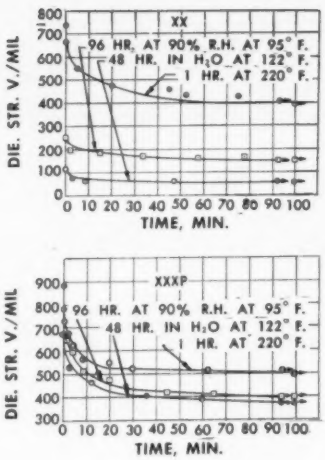
Three 1/16-in. thick samples of grade XX were tested following different types of conditioning. The first set of samples was conditioned 1 hr. at 220° F., the second set was placed in an atmosphere of 90% relative humidity at 95° F. for 96 hr., and the third set was immersed in water at 122° F. for 48 hours. The short-time dielectric strengths for these samples were measured at 73° F. and the relative results are shown in Table III. It is evident from these data that uniform sample conditioning must be kept.

All the samples for the remaining tests were conditioned for 1 hr. at

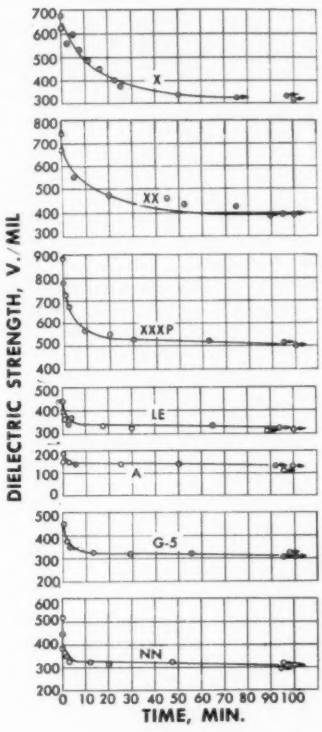
(*Continued on p. 158*)



2—Effect of thickness on dielectric fatigue strength of grade XX laminate tested dry at 73° F.



3, 4—Effect of conditioning treatments on dielectric fatigue strength of 1/16-in. laminates at 73° F.



5—Dielectric fatigue strength of 1/16-in. thick thermoset laminates which were tested dry at 73° F.

[3] "Dielectric Fatigue of Plastics," MODERN PLASTICS 25, 123 (Mar. 1948).
[4] National Electrical Manufacturers Association Standards for Laminated Thermosetting Products, Publication No. 46-118, (Aug. 1946.)

Permeability of Polymeric Films to Gases†

by V. L. SIMRIL†† AND A. HERSHBERGER††

The permeabilities of 21 polymeric films to oxygen, hydrogen, carbon dioxide, nitrogen, ammonia, hydrogen sulphide, and sulfur dioxide, both dry and moist, were studied. The data are presented in terms of a permeability constant P° and are interpreted in terms of the structures and physical properties of the films and the gases. In general, it may be said that gas permeation increases with any decrease in the bonding forces between the polymer molecules of the film and with any increase in the attractive forces between film and gas. Thus, highly polar, strongly bound polymers are less permeable to non-polar gases than are the less polar, weakly bound polymers. The introduction of side chains onto the main polymer chains, the introduction of plasticizers, and the presence of water all tend to increase permeability. Certain significant deviations from this general rule are noted and discussed.

THE selective permeability of polymeric films to certain gases is becoming commercially important. Recently, several investigators, (1-6)[a] using several experimental techniques, have reported permeability data for a number of film-gas combinations. The investigations reported here were undertaken to obtain quantitative data on rates of gas transmission through a number of thin polymeric films and to interpret the data in terms of film and gas molecular structure and the effect of water and plasticizer content of the films.

Preparation of Films

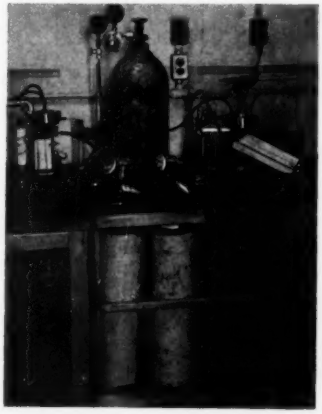
Twenty-one polymeric films were investigated in this study. They are listed with their compositions and preparations in Table I. In general, they were prepared by the same procedures as were given in the first (7) of these two articles.

Reagents

The gases used in this study were purchased in commercial cylinders from a commercial source (8) and were used without further purification. The purities quoted by the manufacturer in terms of percentage were as follows:

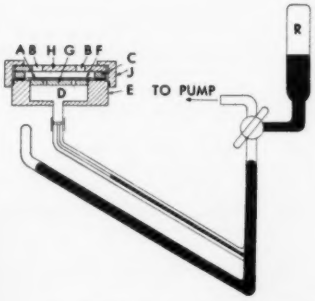
Anhydrous ammonia (NH_3)	99.0
Carbon dioxide (CO_2)	99.0
Hydrogen (H_2)	99.8
Hydrogen sulphide (H_2S)	99.9
Nitrogen (N_2)	99.9
Oxygen (O_2)	99.6
Sulfur dioxide (SO_2)	99.7

1—Gas transmission units used to obtain permeability data. Standard model at left; modified at right



All of the gas permeability data reported here was obtained with a standard General Foods gas-transmission instrument or with a modified instrument constructed to our specifications. These two instruments are pictured in Fig. 1, the standard model being on the reader's left. Schuman (4) and Elder (5) describe the standard model and the method of making gas transmission measurements with it in detail. The modified model (schematically illustrated in Fig. 2) operates on the same principle as the standard, but provides higher sensitivity over a greater range of permeability rates through the use of an inclined manometer and a larger reservoir space on the film's vacuum side.

The major portion of the data was obtained at 24 to 25° C. The testing temperature was not permitted to vary more than ± 0.5° C. from the mean for any particular test. The pressure of the gas above the film was determined by the atmospheric pressure and did not vary more than ± 1 mm. (Hg) during any test. The



2—Sketch of modified model. A) Filter paper; B) gas entrance and exit ports; C) rubber gasket; D) gas chamber; E) block; F) film; G) film support; H) sealing disk; J) clamping ring; and R) mercury reservoir

† For the purposes of this discussion gases are defined as compounds whose boiling points are below 25° C.

†† Cellophane Research, Rayon Department, E. I. du Pont de Nemours & Co., Inc.

[a] Numbers in parentheses link to "References" at end of article.

film being tested was protected from moisture by drying towers in both the incoming and outgoing gas lines except when the influence of water in the gas was being determined. In such cases, the incoming gas was conditioned to the desired humidity by passing through bubble bottles containing saturated salt solutions. The observed exit pressure of the gas was then corrected for the partial pressure of the water vapor and for the pressure drop in the exit gas line.

All gas permeability data obtained in this study are reported here in terms of the permeability constant P* which is defined as the number of moles of gas passing through one sq. cm. of film, one cm. thick, per sec. per cm. (Hg) vapor-pressure difference across the film. Vapor pressure changes on the vacuum side of the film were recorded until P* reached a constant value. The vapor-pressure differences across the films at the time at which P* became constant varied between a minimum of 67 cm. (Hg) and a maximum of 74 cm. (Hg) for the different film-gas combinations. Check determinations were made on each combination using a fresh sample of film each time. Values of P* for check determinations varying more than 10% were not included in the calculations.

Table I.—Film Composition and Preparation

Film No.	*Composition*	*Preparation*
I	Regenerated cellulose; no plasticizer	Viscose process
II	Regenerated cellulose; 12% ethylene glycol plasticizer	Viscose process
III	Regenerated cellulose; 17% ethylene glycol plasticizer	Viscose process
IV	Regenerated cellulose; 14% glycerol plasticizer	Viscose process
V	Regenerated cellulose; 22% glycerol plasticizer	Viscose process
VI	Regenerated cellulose; no plasticizer	Deacetylated cellulose acetate film
VII	Regenerated cellulose; no plasticizer	High solids viscose—heat coagulated and regenerated in acid-salt solution
VIII	Regenerated cellulose; 18% glycerol plasticizer; coated both sides with 3 gm./sq. meter of nitrocellulose-wax moisture-proof coating	Viscose process
IX	Regenerated cellulose; 22% glycerol plasticizer; coated both sides with 6 gm./sq. meter of vinylidene chloride/acrylonitrile (90/10 weight ratio) copolymer moistureproof coating	Viscose process
X	Vinyl butyral/vinyl alcohol (89/11 mole ratio) copolymer	Cast from toluene/isopropanol solution
XI	Vinyl chloride/diethyl fumarate (95/5 weight ratio) copolymer	Cast from toluene/methyl ethyl ketone solution
XII	Nylon; 66/610/6 polyamide (40/30/30 weight ratio)	Cast from isopropanol/water solution
XIII	Rubber hydrochloride	Cast from chlorinated hydrocarbon solution
XIV	Vinylidene fluoride polymer	Cast from dimethyl formamide solution
XV	Vinyl alcohol polymer; no plasticizer	Cast from water solution
XVI	Vinylidene chloride/vinyl chloride (85/15 weight ratio) copolymer	Melt extruded
XVII	Polythene (ethylene polymer)	Cast from xylene solution
XVIII	Chlorinated polythene (33% chlorine by weight)	Cast from xylene solution
XIX	Chlorinated polythene (36.7% chlorine by weight)	Cast from xylene solution
XX	Chlorinated polythene (40.6% chlorine by weight)	Cast from xylene solution
XXI	Ethyl cellulose (48.3% ethoxyl) plasticized with 15% of butyl phthalyl butyl glycolate	Cast from toluene/ethanol solution

Experimental Results

All of the gas transmission data obtained in this study are reported as permeability constants in Tables II through VIII. P* may be converted to practical units such as cc/sq.in./hr., if desired, for any particular gas at any pressure differential across a film of established thickness.

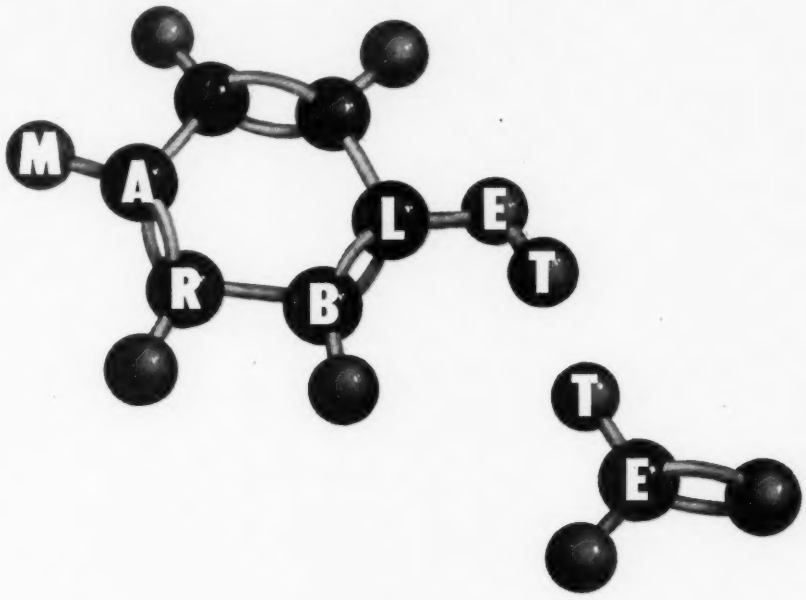
The mechanisms by which gases may pass through films are thought to be the same as those by which vapors penetrate films. Briefly, according to the generally accepted picture, the gas may penetrate existing holes in the polymer structure or holes which are opened momentarily by thermal action, or the gas may dissolve in the film at one surface and evaporate from the film at the opposite surface. Inasmuch as gases are generally less soluble in films at room temperature than are vapors, transport by solution should not be such an important factor as it is for vapors.

Table II.—Permeability of Cellulose Film I

Gas	*Temp.*	*Mol. wt.*	*Dipole moment*[a]	*P*x10¹⁷*
	°C.		*Debye units*	
H_2	24.3	2	0	2.81
NH_3	25.3	17	1.49	7.04
N_2	25.0	28	0	1.43
O_2	24.6	32	0	0.95
H_2S	27.8	34	0.95	0.51
CO_2	24.3	44	0	2.10
SO_2	28.1	64	1.61	0.77

[a] Smyth, C. P., *Dielectric Constant and Molecular Structure* New York: Reinhold Publishing Corp.

The work reported here was concerned with correlating the structures of gases and of various polymer films with permeability rates. The data may conveniently be considered under two headings: regenerated cellulose films and other



Formula for Success

THERE IS ALWAYS ONE RIGHT FORMULA for success—and it is always a *special* formula. That truth holds for a business, a product and a liquid phenolic resin. That is why MARBLETTE provides a *special* formulation for the *special* production and marketing circumstances you face. Your inquiry is always an assignment to us and to our Engineering Staff to create the *right* phenolic resin best suited to your *special* needs.

MARBLETTE'S LIQUID PHENOLIC RESINS are thermo-setting plastics which can be set either by heat or at room temperature; they are weather-proof, solvent-proof; fungi-proof; resistant to abrasion, heat and temperature.

LET MARBLETTE'S 20 YEARS EXPERIENCE HELP YOU in solving your liquid phenolic resin needs—in drums or tank car quantities.

OUR PLANT AND OFFICES are strategically located to serve you promptly anywhere in the United States.

liquid phenolic resins

Resins for foundry matchplates or patterns

Heat and acid resistant resins
Wood coating
Bonding resins
Low pressure laminating resins
Metal coating
Bristle setting cement
Laminating varnish
Plastic cements
Insulating varnish

MARBLETTE

37-21 Thirtieth Street • Long Island City, N. Y. • ST 4-8100
CHICAGO • LOS ANGELES • TORONTO • HAVANA

polymeric films. Such an arbitrary separation does not imply that both types of film do not obey similar laws of permeation, but is made because a greater variety of modifying factors was introduced into the investigation conducted on cellulose film permeability.

Cellulose Films

Effect of Gas Structure on Permeability—The permeability of regenerated cellulose film containing no plasticizer (see Film I in Table I) to seven dry gases is summarized in Table II.

The permeability of dry cellophane to gases is of the order of 10,000 times less than it is to vapors (see the preceding article of this series). This indicates that the cellophane structure is relatively compact and free of holes. There is a rough inverse correlation between the size of the gas molecules and their permeation rates. Remembering that polar cellulose should more readily dissolve polar molecules than non-polar molecules, the enhanced permeability of cellophane to ammonia and sulfur dioxide becomes understandable. On the basis of molecular size and polarity, the transmission rate of carbon dioxide appears to be too high. The incorporation of water in cellulose greatly increases carbon dioxide transmission (as shown in Table IV) and

Table III.—Gas Permeability of Structurally Dissimilar Cellophanes at 0% Relative Humidity

Film No. and type	$P^* \times 10^{17}$	
	O_2	CO_2
I Regenerated cellulose	0.88	2.10
VI Deacetylated cellulose acetate sheet	4.12	4.34
VII Heat-coagulated viscose cellulose	5.46	.....

it is possible that a very small amount of water, inadvertently allowed to remain in the cellophane, is responsible for the high P^* value. In this event, P^* for carbon dioxide must be considered correct only as to order of magnitude. It is practically impossible to secure completely dry cellulose.

Effect of Film Structure on Permeability—X-ray diffraction, water absorption, and physical property data (9) indicate that the physical structure of a cellulose sheet may be modified by the technique used in preparing it. An attempt was made to determine whether or not these structural changes would be reflected in gas transmission rates. The data of Table III indicate that three different cellulose films, normally thought to be quite different structurally, all exhibit gas transmission rates of the same order of magnitude.

Even the differences in P^* exhibited by these films may be due to mechanical flaws in the film. The best obtainable samples of the experimental deacetylated cellulose acetate and heat-coagulated films contained some thin spots and bubbles. However, the greater permeability of the experimental films compared to the machine-cast cellophane is in line with the less ordered structure assigned to them from water absorption and x-ray diffraction data.

Effect of the Presence of Water Vapor on Permeability—Cellulose films sorb water from gases containing water vapor. This phenomenon might be expected to affect the rate of transmission of a gas through a cellophane film in two ways. Thus, absorbed or adsorbed water might act as active centers for gas adsorption and increase gas permeation by a process of solution and evaporation. Also, the physical structure of cellulose is changed by sorbed water. Some of the active hydroxyl groups which, when water-free, would aid transmission of gases might be covered or blocked by the water and thus decrease gas transmission. On the other hand, the process of sorbing water causes the cellulose structure to expand and weakens the intermolecular forces to such an extent that the number of existing and potential holes available for gas transmission is increased. It might be expected that the permeability of cellulosic films to most gases would be increased by increasing the water content of the film. The data of Table IV substantiate this expectation.

The data in Table IV show clearly that the increase of permeability of a wet film over a dry film is closely related to the solubility of the permeant gas in water. It is obviously necessary to know the relative humidity of a gas and its solubility in water before calculating its rate of permeation through a cellulose film.

Effect of Plasticizers on Permeability—It was demonstrated in the preceding article of this series that plasticizers may either increase or decrease the vapor permeability of a film. It was postulated that an increase was brought about by the spreading effect of the plasticizer on the polymer chains and, in some cases, by the solution of the vapor in the plasticizer. On the other hand,

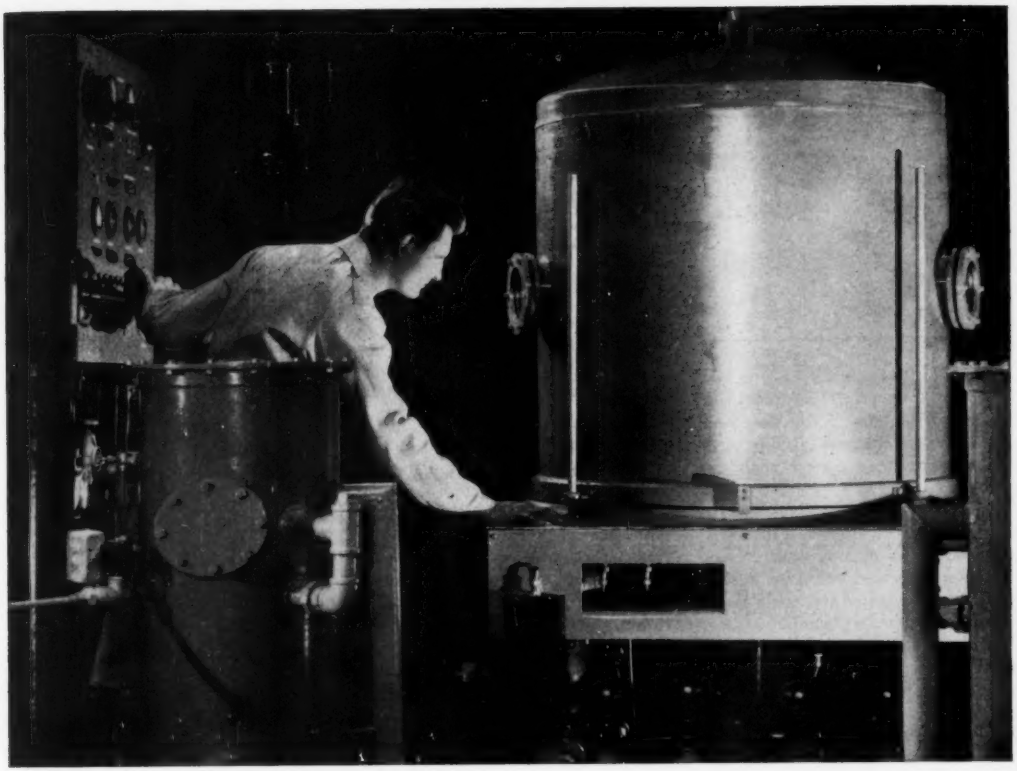
Table IV.—Gas Permeability of Wet Regenerated Cellulose Film I at 24.5° C.

Gas	S^a	$P^* \times 10^{17}$ *at various relative humidities*			
		0%	*43%*	*79%*	*100%*
H_2	0.018	2.81	7.14	14.50	35.60
O_2	0.028	0.95	3.19	3.96	5.18
N_2	0.014	1.43	3.02	3.33	8.20
CO_2	0.770	2.10	5.80	32.10	114.50
NH_3	632.000	7.04	.....	.....	79,000.00
SO_2	33.400	0.77	.....	.....	16,900.00
H_2S	2.310	0.51	.....	.....	253.00

[a] S is volume of gas (S.T.P.) dissolved in 1 volume of water when the pressure of the gas is 760 mm. Data from Lange's *Handbook of Chemistry*, 4th edition (1941).

a decrease was assumed to be caused by the blocking effect of the plasticizer in filling holes and adsorbing on active polymer groups which otherwise would be available for vapor solution. It would be reasonable to assume that plasticizers would have the same effects on gas transmission. The data of Table V indicate that plasticized regenerated cellulose is always more permeable to gases than unplasticized cellulose film, indicating that any blocking effect present is less important than chain spreading and/or gas solution due to plasticizer.

Measured by the extent to which they increase permeability, ethylene glycol and glycerol are roughly equivalent. The data taken at 100% relative humidity indicate that plasticized regenerated cellulose sorbs water more advantageously, from the standpoint of providing a diffusion path for gases, than does unplasticized regenerated cellulose. In normal practice, one is always concerned with a more or less moist gas and a plasticized film. For this



Watching an Economy Wave IN PLASTICS COATING

INSIDE the chamber are racks of plastic items being coated with a brilliant metallic surface. The application is vacuum coating. Special lacquers under and over the metallic film insure permanence and gloss.

The equipment is DPi-made. The lacquers are selected with DPi assistance. DPi technical advice made the entire project possible.

The stainless steel bell jar—38 inches in diameter and 42 inches high, shown above in DPi's LC 1-36 Vacuum Coating Unit—is ideal for batch coating. Several manufacturers are using this unit for coating small plastic novelties for the dime store trade. It has proved its practical economy in this field where there is a very small margin per unit of sale.

New applications for vacuum coating are being developed almost daily. It is already a regular, standard production tool, lowering costs for many manufacturers.

Write for your free copy of the DPi booklet, "Vaporized Metal Coatings by High Vacuum." It gives full data for our entire line of coating units, ranging from a simple 10-inch bell jar to a 16-station turntable unit.

VACUUM EQUIPMENT DEPARTMENT

DISTILLATION PRODUCTS *industries*

Division of Eastman Kodak Company

779 RIDGE ROAD WEST, ROCHESTER 3, N. Y.

Distillers of Oil-Soluble Vitamins and Other Concentrates for Science and Industry; Manufacturers of High Vacuum Equipment

DPi

HIGH VACUUM RESEARCH AND ENGINEERING

Table V.—Gas Permeability of Plasticized Regenerated Cellulose Films

Film	Plasticizer Type	Plasticizer % of dry film wt.	Relative humidity %	$P^* \times 10^{7}$ H_2	O_2	N_2	CO_2	SO_2	H_2S
I	None		0	2.81	0.95	1.43	2.10	0.77	0.51
I	None		100	35.60	5.18	8.20	114.00	.....	253.00
IV	Glycerol	14	0	3.63	3.22	2.03	3.92	.....	.....
V	Glycerol	22	0	6.60	4.51	3.45	4.98	33.6	1.00
V	Glycerol	22	100	.....	546.00	.....	754.00	.....	.....
II	Ethylene glycol	12	0	3.04	2.91	1.76	3.43	.....	.....
III	Ethylene glycol	17	0	5.24	.....	3.03	3.51	.....	.....

reason, it is imperative to know the plasticizer content of the film and the moisture contents of film and gas in solving any gas permeability problem.

Effect of Coatings on Regenerated Cellulose Permeability—The gas permeability of dry, plasticized, uncoated regenerated cellulose is less than that of most of the other film-forming polymers studied (see Tables V and VII). As a consequence, it would be reasonable to expect that the cellulose portion of polymer-coated cellophane sheets would be the permeability rate controlling portion. This would be particularly true of films coated with nitrocellulose-based coating. Cellulose derivatives are generally more permeable to gas and vapors than cellulose. The incorporation of wax, plasticizer, and resins in the coating further increases permeability, probably by disrupting any ordered existence the nitrocellulose molecules may have enjoyed otherwise. On the other hand, vinylidene chloride copolymers are almost as gas impermeable as dry regenerated cellulose, but, as thin coatings, they could not be expected to increase the over-all impermeability of the regenerated cellulose film to any appreciable extent.

The above discussion considers only dry gases. Inasmuch as water vapor penetrates all so-called "moistureproof" coatings at a measurable rate, sooner or later equilibrium between the water vapor in the diffusing gas and the cellulose base sheet will be attained. When equilibrium is reached, the gas transmission rate will be much higher unless a relatively gas-impermeable coating has been used.

The data of Table VI are in line with expectations. Wet, plasticized regenerated cellulose film V is highly permeable to carbon dioxide and oxygen. The nitrocellulose-based coating of film VIII decreases this permeability somewhat, but the effect of the water is still large. The permeability of the vinylidene chloride/acrylonitrile-coated film IX to wet gases is relatively quite small indicating that the coating (which is not much affected by water) has become the real obstacle confronting gas transmission.

Non-Cellulosic Films

The permeabilities of 12 non-cellulosic films to dry oxygen and carbon dioxide and to moist carbon dioxide were determined. The data are summarized in Table VII together with some data on hydrogen, nitrogen, and information on hydrogen sulfide.

The data of Table VII represent a spectrum of permeability ranging from unplasticized regenerated cellulose, polyvinyl alcohol, and vinylidene chloride/vinyl chloride on the low side to polythene, vinyl butyral/vinyl alcohol copolymer, and plasticized ethyl cellulose on the high side. The variation in permeability appears to be connected to variations in the structure and properties of the polymers and gases. Apparently, for gas permeability, the intermolecular attractive forces of the polymer film are quite important. If these forces are strong, the polymer chains should be held tightly together and it will be difficult for holes to form through which gas molecules may pass. This hypothesis implies that the gas molecules will have little effect on the interchain bonds of the polymer. As an illustration, it is interesting to observe that dry polyvinyl alcohol, whose interchain forces are strong, exhibits low permeability both to the polar hydrogen sulfide molecule and the non-polar hydrogen and oxygen molecules. On the other hand, polythene can be held together only by weak van der Waal's forces, and it is highly permeable to both polar and non-polar gases. The presence of side chains on the main chains or of plasticizer molecules between polymer chains would be expected to decrease polymer intermolecular forces or to increase the number of paths available to gases in some fashion. Evidence that this does happen is available in the relatively high permeability of such films.

A comparison of the gas and vapor permeability of a few typical films provides a clue to the importance to permeability of the interaction (adsorption and intermolecular bond breaking) of polymer and diffusing molecule.

In the examples listed in Table

Table VI.—Permeability of Coated Regenerated Cellulose Films

Film	No. and type	Relative humidity %	$P^* \times 10^{7}$ H_2	O_2	CO_2	SO_2
V	Uncoated regenerated cellulose with 22% glycerol plasticizer	0	6.60	4.51	4.98	1.00
		100	.....	546.00	754.00	.....
VIII	Regenerated cellulose with 18% glycerol plasticizer coated with a nitrocellulose-based moistureproof coating	0	6.53	3.45	5.59	.....
		100	.....	190.00	.....	.....
IX	Regenerated cellulose with 22% glycerol plasticizer coated with vinylidene chloride/acrylonitrile (90/10) copolymer moistureproof coating	0	.....	5.30	6.84	1.84
		100	.....	12.70	13.70	11.47

Table VII.—Permeability of Plastic Films to Gases

Film	No. and Composition	Relative humidity	P* x 10^{11}				
		%	H_2	O_2	N_2	CO_2	H_2S
I	Regenerated cellulose; no plasticizer	0	2.81	0.95	1.43	2.10	0.51
		100	35.60	5.18	8.20	114.00	253.00
V	Regenerated cellulose; 22% glycerol plasticizer	0	6.60	4.51	3.45	4.98	1.00
		100	.....	546.00	.....	754.00	.....
X	Vinyl butyral/vinyl alcohol (89/11 mole ratio copolymer	0	4250.00	464.00	.....	2280.00	2670.00
		100	.....	.....	.....	1720.00	2940.00
XI	Vinyl chloride/diethyl fumarate (95/5 weight ratio) copolymer	0	1040.00	50.60	.....	169.00	.....
		100	.....	51.40	.....	281.00	.....
XII	Nylon; 66/610/6 polyamide (40/30/30 weight ratio)	0	.....	14.50	.....	25.3	.....
		100	.....	.....	.....	261.00	.....
XIII	Rubber hydrochloride	0	.....	42.50	.....	139.00	.....
		100	.....	.....	.....	202.00	.....
XIV	Vinylidene fluoride polymer	0	184.00	24.40	.....	160.00	.....
		100	.....	.....	.....	162.00	.....
XV	Vinyl alcohol polymer; no plasticizer	0	4.00	3.96	.....	5.50	3.10
		100	.....	.....	.....	38,700.00	.....
XVI	Vinylidene chloride/vinyl chloride (85/15 weight ratio) copolymer	0	.....	5.96	.....	5.09	.....
		100	.....	.....	.....	10.60	.....
XVII	Polythene (ethylene polymer)	0	2210.00	708.00	225	2740.00	6620.00
		43	1980.00	685.00	167	2580.00	7750.00
		100	.....	839.00	.....	3820.00	.....
XVIII	Chlorinated polythene (33% chlorine by weight)	0	.....	77.80	.....	276.00	.....
		100	.....	.....	.....	434.00	.....
XIX	Chlorinated polythene (36.7% chlorine by weight)	0	.....	75.90	.....	228.00	.....
XX	Chlorinated polythene (40.6% chlorine by weight)	0	.....	45.90	.....	127.00	.....
XXI	Ethyl cellulose (48.3% ethoxyl) plasticized with 15% of butyl phthalyl butyl glycolate	0	.....	3470.00	.....	21,200.00	.....
		100	.....	.....	.....	22,500.00	.....

VIII, the films are 1000 to 100,000 times as permeable to the vapors (benzene and ethanol) as to the gases (CO_2 and H_2S). Inasmuch as the vapor molecules are at least as large as the gas molecules, the gas permeability should be a reasonable measure of the maximum hole content available for either vapor or gas transmission. Therefore, almost all of the vapor permeability must result from the action of the vapor on the polymer. That this action should involve polymer intermolecular bond breaking and vapor solution seems quite reasonable. It is also quite significant that those gases which are most easily condensed (H_2S and CO_2) behave more nearly like vapors, with respect to permeation, than do the difficultly condensable gases, namely: H_2, O_2, and N_2.

Table VIII.—Gas Versus Vapor Permeation

Film	No. and type	Gas or Vapor	P* x 10^{11} (at 25° C. for gases and 35° C. for vapors)
XVII	Polythene	Benzene	236.5
		CO_2	0.274
XI	Vinyl chloride/diethyl fumarate	Benzene	42.2
		CO_2	0.017
I	Regenerated cellulose; no plasticizer	Ethanol	3.83
		H_2S	0.00005

It will be remembered that in the case of regenerated cellulose the addition of plasticizer or water appeared always to increase gas permeability. That water may have the same effect in non-cellulosic films may be seen from the data of Table VII. However, in the cases of some highly permeable films, water appears to block gas diffusion. Polythene, which absorbs small quantities of water at high relative humidities, becomes less permeable as some water is added and then more permeable as it becomes saturated. Vinyl butyral/vinyl alcohol copolymer when saturated with water is less permeable to carbon dioxide but more permeable to hydrogen sulfide than when dry. Perhaps in the case of carbon dioxide the blocking effect outweighs the moderate attraction of water for carbon dioxide, and in the case of hydrogen sulfide the higher attraction overcomes the blocking effect.

Acknowledgment

The authors gratefully acknowledge the assistance of Miss Claire Kaiser who made the majority of the permeability measurements reported here.

References

1. N. Riehl, Kolloid Zeitschrift No. 106, 201-206 (Mar. 1944).
2. S. A. Reitlinger, J. Gen. Chem. U.S.S.R. *14*, 420-7 (1944).
3. M. Kleiber and F. R. Smith, Modern Packaging *18*, No. 5, 117-118, 140 (Jan. 1945).
4. A. C. Schuman, Ind. Eng. Chem. Anal. Ed. *16*, 58-60 (1944).
5. L. W. Elder, Modern Packaging *16*, 69-71 (July 1943).
6. D. W. Davis, Modern Packaging *18*, No. 9, 145 (May 1946).
7. V. L. Simril, and A. Hershberger, MODERN PLASTICS *27*, 97, (June 1950).
8. Matheson Co., East Rutherford, N. J.
9. Simril, V. L., *"The Sorption of Water Vapors by Polymers"* Doctoral Thesis, Univ. of North Carolina, 1942.

See for yourself...

Stop in at a cosmetic counter in a department store. A package catches your eye, a package you fabricated from Kodapak Sheet. No wonder, you say, Kodapak Sheet is performing sales miracles... helping to cut costs... helping to speed turnover. Here's why...

1 *It's transparent—optically clear.*
Customers see colors, details—decide quickly.

2 *It has great brilliance.*
Shows merchandise at its best. Speeds sales.

3 *It's tough, durable.*
Withstands handling. Minimizes shopwear.

4 *It's stable.*
Does not discolor or lose clarity.

5 *It's rigid, keeps its shape.*
Relatively unaffected by humidity.

6 *It's chemically inert.*
Won't stain or discolor merchandise.

7 *It's light as a feather.*
Cuts package weight.

8 *It's uniform.*
Free from surface defects and blemishes.

9 *It's easy to handle.*
Forms readily. Fabricators like it.

10 *It's available in two basic forms—*
a sheet to fit every job:
Kodapak I Sheet, cellulose acetate, gauges up to 0.060"; Kodapak II Sheet, cellulose acetate butyrate, gauges up to 0.002". Both forms are made to the same high standards as Kodak photographic film base.

For further information, consult your nearest representative, or write Kodak; and a visit to the Kodapak Demonstration Laboratory in Rochester will prove helpful.

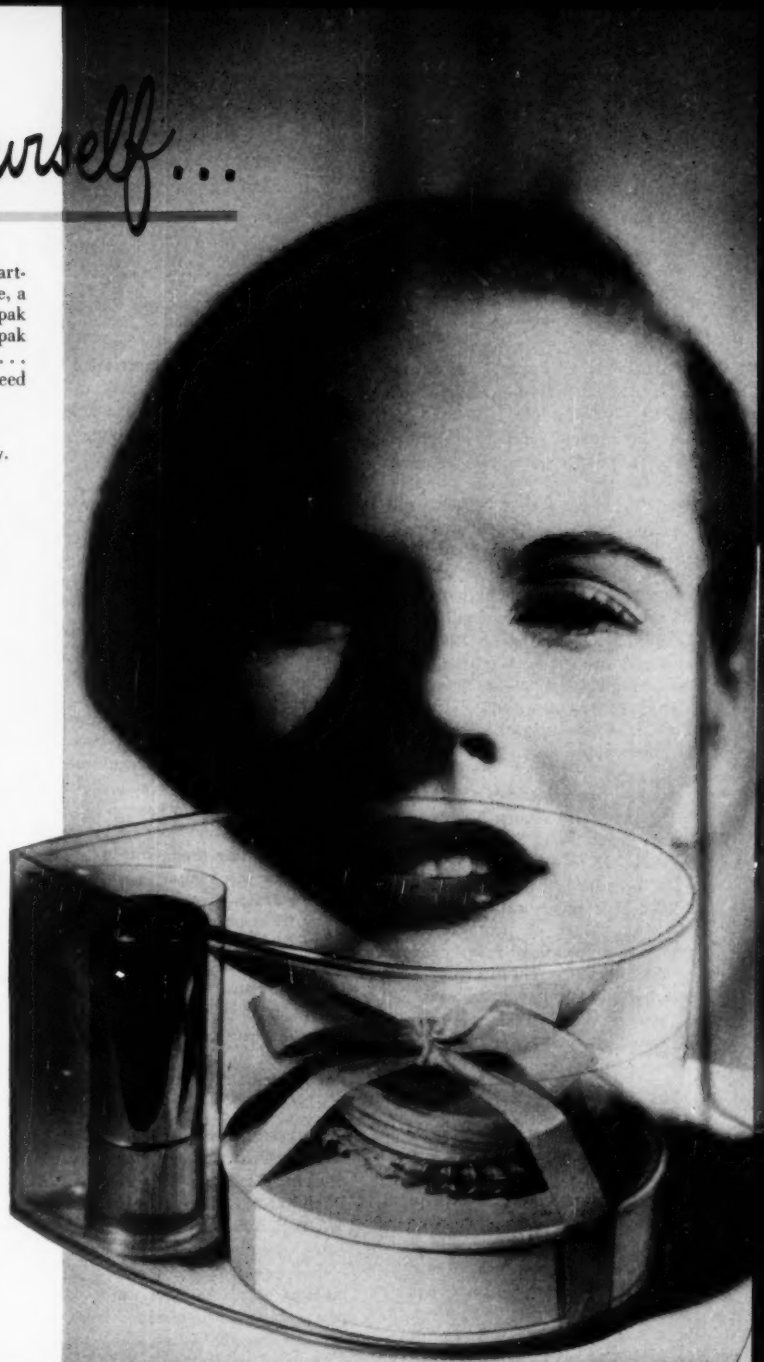
Cellulose Products Division
EASTMAN KODAK COMPANY
Rochester 4, N. Y.

Sales Offices:
New York, Chicago.

District Sales Representatives:
Cleveland, Dallas, Philadelphia, Providence.

Pacific Coast Distributor:
Wilson & Geo. Meyer & Co., San Francisco, Los Angeles, Portland, Seattle.

Canadian Distributor:
Paper Sales, Limited, Toronto, Montreal.



Kodapak Sheet

"Kodapak" is a trade-mark

FOR THE DISPLAY YOU WANT... THE PROTECTION YOU NEED...

Kodak
TRADE-MARK

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed.

Properties

MECHANICAL PROPERTIES OF POLYETHYLENE. R. H. Carey, E. F. Schulz, and G. J. Dienes. Ind. Eng. Chem. *42*, 842-7 (May 1950). A study of the fundamental and practical mechanical properties of various molecular-weight polyethylene resins by means of tensile stress-strain and torsional torque-deflection curves is described. By combining these two techniques, the stiffness properties are evaluated with good accuracy over an unusually wide range of temperatures. Other mechanical properties, such as stress and strain at the "elastic limit" and energy of strain can also be evaluated quantitatively on the basis of these data.

HEATS OF POLYMERIZATION. A SUMMARY OF PUBLISHED VALUES AND THEIR RELATION TO STRUCTURE. D. E. Roberts. J. Research National Bureau Standards *44*, 221-32 (March 1950). This paper contains a table showing values of heats of polymerization assembled from a survey of the literature. There are 42 substituted vinyl compounds arranged as follows: vinyl alkyls, vinyl aryls, other vinyls, vinyl acids and esters, dienes, and copolymers. Ethylene has the highest and α-methylstyrene the lowest heat of polymerization; isobutene and the methacrylates also are low. Disubstitution on the same vinyl carbon is a frequent cause of steric interference with consequent reduction in heat of polymerization. Large branched substituents may cause steric interference. The substitution of chlorine on the aromatic ring of styrene has little effect on heat of polymerization. Steric interference may prevent polymerization above the dimer. The heat of copolymerization of butadiene and styrene lies between the values for the separate monomers. Heat of copolymerization of other monomer pairs may be higher or lower than the value for the separate components. Heat of polymerization depends somewhat on the ratio of 1,2- and 1,4-addition, and on the amount of crystallinity of the polymers.

STRUCTURE AND PHYSICAL PROPERTIES OF MASSIVE NYLON. G. L. Clark, M. H. Mueller, and L. L. Stott. Ind. Eng. Chem. *42*, 831-7 (May 1950). Utilizing familiar metallurgical techniques, studies were made of the structure and texture of massive nylon ranging in size from 0.011-in. strip to 3-in. rod. These techniques were x-ray diffraction, photomicrography, hardness and density measurements, heat treatment and recrystallization in various media, tensile measurements, etc. Of principal interest is the fact that the two most intense x-ray diffraction rings vary in angular position depending upon the previous history of the sample, such as size, cooling rate, heat treatment, and aging. It is possible directly to correlate many of the properties of the nylon with these angular shifts. On the basis of this information nylon in massive forms for gears and other uses may be used more intelligently and performance may be more adequately predicted and controlled.

DETERMINATION OF THE WATER-VAPOR PERMEABILITY OF CABLE-SHEATH MATERIALS. H. Heering, H. Puell, and I. Drewitz. Kunststoffe *38*, 49-51 (1948). A piece of plastic cable sheath is used to make a closed bag which contains a small amount of water. The water-vapor permeability is determined from the loss of weight when the bag is placed in a desiccator filled with phosphorus pentoxide. The water-vapor permeability of several materials in 10^{-8} grams per hr. per cm. thickness per sq. cm. per mm. of pressure differential was found to be as follows: polyisobutylene-carbon black 0.006 to 0.08, paraffin 0.02, polyisobutylene 0.14, Thiokol 0.08 to 0.50, polyethylene 0.22, polybutene-polystyrene 0.25, rosin 0.34, bitumen 0.80, natural rubber 0.80 to 5, gutta percha 1.3, polyvinyl chloride 2 to 10, polystyrene 3.3, benzylcellulose 16, polyacrylate 31, cellophane 77 to 200, and cellulose triacetate 100.

MECHANICAL PROPERTIES OF HIGH POLYMERS AS FUNCTIONS OF THE SHAPE OF THE DISTRIBUTION CURVE. II. CONTROLLED FRACTIONATION OF ETHYLCELLULOSE. P. C. Schere and R. D. McNeer, Jr. Rayon Synthetic Textiles *30*, 56-9 (1949). The fractionation of ethylcellulose was achieved by precipitating with water from an ethyl acetate acetone solution. The fractions were stable, and all had the same ethoxy content.

Testing

PLASTICS AID IN FILM PRODUCTION. Brit. Plastics *21*, 580-4 (Nov. 1949). The use of plastics in the construction of movie sets is described.

ANALYSIS OF CELLULOSE DERIVATIVES. L. B. Genung. Anal. Chem. *22*, 401-5 (Mar. 1950). Cellulose derivatives, because of their high polymeric, carbohydrate structure, require modifications of conventional methods of organic analysis. Conditions of temperature, time, and reagent concentration must be kept within prescribed limits in order to avoid interfering side reactions and obtain accurate results. The acetyl content of cellulose acetate is ordinarily determined by saponification. Heterogeneous methods (saponification in suspension) are generally used, but methods based on saponification in solution have several advantages and are practical when the solubility behavior of the sample is known. Mixed esters of cellulose may be analyzed by the partition method, or by determining characteristic groups, such as halogen, alkoxyl carboxyl, or hydroxyl, in addition to total acyl content. Cellulose nitrate is analyzed by converting the nitrate group to nitric oxide and measuring the latter volumetrically. Methyl and ethyl ethers of cellulose are analyzed by modern versions of the Zeisel method and carboxymethylcellulose by titration of its carboxyl groups. Salts of the

*Reg. U. S. Pat. Office.

FOR ASSURED QUALITY IN PLASTICS!

FORMALDEHYDE

Formaldehyde Solution U.S.P. (37% by weight). A clear, colorless liquid of the highest purity. Shipped in tank cars, tank trucks, drums, carboys and bottles. Methanol-free grade also available.

PARAFORMALDEHYDE

Uniformity, purity and high assay characterize this raw material for plastics, resins, adhesives, etc. Powder, Flo Granules and Granules. Shipped in 250, 100, 50 and 25 lb. fiber drums.

HEXAMETHYLENETETRAMINE

A uniform and pure source of anhydrous formaldehyde for use in molding powders, etc. U.S.P. and Technical grades. Shipped in 200 and 150 lb. bbls.; 100, 50 and 25 lb. fiber drums.

• • •

Also Available: **Phenyl Salicylate, Dibenzyl Ether, Pentacizers and Pentek.**

HEYDEN
CHEMICAL CORPORATION
393 SEVENTH AVE., NEW YORK 1, N. Y.
CHICAGO 6 • PHILADELPHIA 3 • SAN FRANCISCO 11 • RUMFORD 16, R.I.

FINE HEYDEN CHEMICALS

Benzaldehyde • Benzoates • Benzyl Chloride • Bromides
Chlorinated Aromatics • Chlorobenzenes • Creosotes • 2,4-D • Formaldehyde
Formic Acid • Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid • Paraformaldehyde
Parahydroxybenzoates • Penicillin • Pentaerythritols • Propyl Gallate
Quebrachos • Salicylates • Salicylic Acid • Streptomycin

latter derivative may be analyzed by the methods of inorganic analysis after careful removal of organic matter.

Applications

PRESERVING FRAGILE OBJECTS. M. A. Arthur. S.P.E. J. *6*, 3, 10 (Apr. 1950). The preservation of fragile objects by coating them in casting polyester and acrylic plastics is reviewed. Six references.

"POLY" WRAP SEEN FILLING MANY PACKAGING NEEDS. F. W. Tauber, A. J. Davis, and M. Goldman. Food Industries. *21*, 728-9, 864, 866 (1949). Polyethylene films are used for packaging foods because of their low water-vapor transmission, high transmission of oxygen, carbon dioxide, and sulfur dioxide, differential transmission of food odors, flexibility at low temperatures, and nontoxic nature. Data on transmission of oxygen, water, and essential oils and strength properties are reported.

NYLON PLASTICS MAKE TOUGH COMPONENTS. Electrical Manuf. *45*, 110-14, 194, 196, 198, 200, 202, 204 (Apr. 1950). The properties and applications of five types of nylon molding compounds are reported.

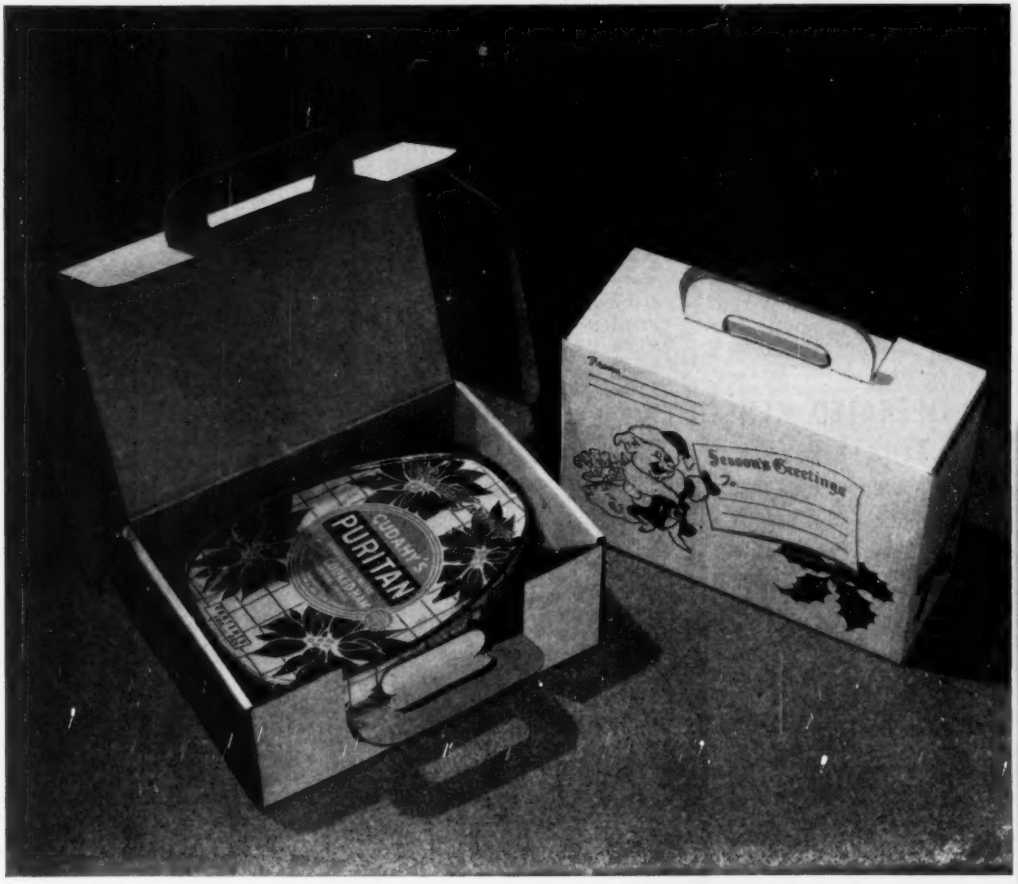
THERMOPLASTICS IN RESILIENT CONCRETE. N. W. Farmer. Plastics (London) *15*, 89 (Apr. 1950). The addition of a dilute aqueous dispersion of polyvinyl acetate to a concrete mix increases the flexibility of the product and the adhesion to the base floor.

APPLICATIONS OF EXPANDED PLASTICS. Plastics (London) 15, 93-5 (Apr. 1950). Recent developments in expanded plastics and their applications in the United States are reviewed. Eight references.

BUILDING WITH HONEYCOMB PLASTICS. G. May. Plastics (London) *15*, 90-2 (Apr. 1950). The construction of buildings with a honeycomb core plastic wall board is described. Aircraft type construction is used.

NEW RESINS PROVIDE PRACTICAL BONDING AGENTS FOR METALS. E. Preiswerk, K. Meyerhans and E. Denz. Materials and Methods *30*, No. 4, 64-6 (1949). Metals can be bonded

Creative Package Design



this corrugated "luggage" box

Displays the product . . . suggests itself as a gift . . . prompts the purchase . . . simplifies the sale . . . encourages "take-with" buying . . . eliminates repacking and rewrapping . . . offers re-use value . . . is adaptable to mailing. Give your product package action to make it stand out above competitive merchandise. Consult Hinde & Dauch, Executive Offices, 5004 Decatur St., Sandusky, Ohio.

H&D®

HINDE & DAUCH

Authority on Packaging

DO YOU MANUFACTURE GIFT ITEMS? Write for colorful, beautifully illustrated booklet, "Setting the Stage for Holiday Merchandising," outlining the secrets of increasing sales through corrugated gift boxes.

FACTORIES AND SALES OFFICES IN: Baltimore • Buffalo • Chicago • Cleveland • Detroit • Gloucester, N. J. • Hoboken, N. J. • Kansas City, Kan. • Lenoir, N. C. • Richmond, Va. • Sandusky, Ohio St. Louis • Watertown, Mass. SALES OFFICES IN: Akron • Battle Creek • Cincinnati • Columbus • Denver • Erie, Pa. • Fairfield, Conn. • Findlay, Ohio • Greensboro, N. C. • Indianapolis • Miami Minneapolis • Olean, N. Y. • Omaha • Philadelphia • Pittsburgh • Reading, Pa. • Roanoke, Va. • Rochester • Toledo • Worcester, Mass. IN CANADA, HINDE & DAUCH PAPER CO. OF CANADA, LTD., Toronto • Montreal • Chatham • Calgary • Halifax • Hamilton • Kitchener • London • Peterborough • Quebec • Regina • St. John, N. B. • St. John's, Newfoundland • Vancouver • Winnipeg

with the aliphatic-aromatic-ethylene oxide resins to have shear strength ranging from 10,700 p.s.i. at —76° F. to a strength of 4200 p.s.i. at 212° F.

Materials

FILLED POLYETHYLENE COMPOUNDS. R. Bostwick and R. H. Carey. Ind. Eng. Chem. *42*, 848-9 (May 1950). The use of inorganic fillers to increase the stiffness of polyethylene compositions is described. It was found that incorporation of suitable fillers does not substantially affect processing and injection molding characteristics. Silica, carbon, clay, and calcium carbonate fillers were found to be effective in increasing stiffness and, in general, fillers of smaller particle size were most effective. Multiflex MM, Clay 33, and Superfloss, for example, in 40% concentration by weight in DYNH polyethylene resin, increased stiffness by approximately 100%. Thus, as regards stiffness these compounds are approximately equivalent to a D-200 resin. Fillers reduced tensile strength, tear strength, and ultimate elongation and raised brittle temperature.

LOW-MOLECULAR-WEIGHT POLYETHYLENE RESINS. C. W. Patton. S.P.E. J. *6*, 11-12 (Feb. 1950). The properties of low-molecular-weight polyethylene resins are summarized in detail.

SILICONES. D. V. N. Hardy. J. Oil & Colour Chemists' Assoc. *32*, 202-21 (1949). The synthesis of silicone rubbers, greases, and resins is reviewed. 19 references.

RECENT PROGRESS MADE IN SILICONE RUBBER MATERIALS. C. E. Arntzen and R. D. Rowley. Materials and Methods *30*, No. 4, 73-6 (1949). The properties of silicone rubbers are reviewed. They are used for gaskets, belting, and electrical insulation.

STYRENE COPOLYMERS IN ALKYD RESINS. N. R. Bhow and H. F. Payne. Ind. Eng. Chem. *42*, 700-3 (Apr. 1950). Styrene is copolymerized by the mass method with commercial fatty acids having conjugated unsaturation, and the rates of reaction are reported for various amounts of excess styrene. Alkyd resins are made by reacting the styrenated fatty acids of dehydrated castor oil with phthalic anhydride and glycerol. A laboratory process is described for completing both the copolymerization and the alkyd reactions in from 4 to 6 hours. Evaluation of the experimental styrenated alkyds in clear films and in white enamels shows that they have superior drying time and chemical resistance to conventional phthalic alkyds. In view of the present and possible future price structure of styrene and the other resin-forming ingredients it appears certain that styrenated alkyds will be important in the surface-coating industry from both economic and performance considerations.

PROPERTIES OF SOME HIGHER POLYMETHACRYLIC ESTERS. J. W. C. Crawford. J. Soc. Chem. Ind. *68*, 201-8 (1949). The hardness, softening temperatures, index of refraction, and molecular weight of a number of polymeric methacrylic esters are reported.

DEVELOPMENTS WITH COLD MOLDING THERMOPLASTIC MATERIAL. Brit. Plastics *22*, 153-5 (Mar. 1950). A thermoplastic sheet made by adding fibers to a viscous vinyl resin emulsion can be molded cold in a semi-dry state without pressure. Properties and forming techniques are described.

Molding and Fabricating

STANDARDIZATION OF MOLDS OF CYLINDRICAL SHAPE. H. Turnwald and G. Ehlers. Plastics (London) *15*, 106-8 (Apr. 1950). Engineering design of molds for cylindrical shapes is discussed and illustrated.

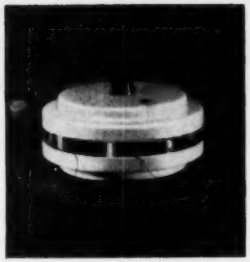
THERMOSETTING EXTRUSION. G. Holmgren. S.P.E. J. *6*, 9 (Apr. 1950). The extrusion of thermosetting plastics is described briefly.

PIN-POINT GATING. R. G. Davis. S.P.E. J. *6*, 10-12 (March 1950). The theory and method of pin-point gating are reviewed.

BOAT HULLS BY LOW-PRESSURE LAMINATION. B. Parkyn. Brit. Plastics *22*, 110-14 (March 1950). The manufacture of boat hulls from polyester resins and glass fiber by a low pressure molding technique is described.

NEW PRODUCTS IN PLAX PLASTICS

PLAXPAK FILM'S high chemical resistivity and moisture-proof protection improve and simplify packaging of corrosive chemicals. Hooker Electrochemical Company uses Plaxpak drum liners to package monochloroacetic acid and seal it against moisture.



THREAD CADDY by the Emeloid Co., Inc., Hillside, N. J., keeps eight spools of thread handy and visible. Window of brilliantly clear Polyflex* makes it possible for user to identify thread instantly. Polyflex is a sturdy material with metallic crackle, high gloss finish.

DIAPER BAGS of Plaxpak polyethylene film introduce new era of clean, odor-free and moisture-proof laundry service. Developed by Dependable Products, Inc., New York City, the Plaxpak bags cost less, last longer, and are more satisfactory to customers.

SEARCHLIGHT BECOMES SIGNAL FLARE when equipped with cone of red embossed Plaxpak polyethylene film. Glowing red signal is visible for half mile. Safety signal cone is manufactured by the Red Glow Safe-T-Signal Company, New London, Conn.

ATTRACTIVE TRAVEL KIT by Jean Nate features nine-ounce Plaxpak bottle of "friction pour le bain" after-bath lotion. Lightness and unbreakability of Plaxpak bottle make it an ideal container for traveling. Takes rough handling, squashing in stride.

UNBREAKABILITY AND INERTNESS to hydrofluoric acid make the Plaxpak bottle a super-convenient container for Johnson Chemical Industries' Rust-E-Lim, a rust stain remover used in the laundry and dry cleaning industries. Insert plug emits thin stream.

Need a plastics material in a special form? It's a good idea to see Plax. Plax has originated many new material forms, among them the Plaxpak polyethylene bottle and Polyflex*. Polyflex is polystyrene oriented in two directions for greater strength. It features brilliant clarity, metallic crackle, low cost, and ease of fabrication. More information on all Plax products can be obtained by writing for our new catalog on your company letterhead.

PLAX BLOW MOLDED PRODUCTS ARE MADE UNDER THE FOLLOWING U. S. PATENTS: 2128239, 2175053, 2175054, 2256189, 2293190, 2360760, 2383756, 2340678, 2340677, 2349078. *TRADE MARK REG. U. S. PATENT OFFICE.

PLAX
FOR PLASTICS
NOT SUBSTITUTES···IMPROVEMENTS

PLAX CORPORATION, P. O. BOX 1019, HARTFORD 1, CONNECTICUT
In Canada, Plax Canada, Ltd., Toronto

Offices in New York City, Syracuse, Philadelphia, Cincinnati, Chicago, St. Louis and Houston

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

RESIN EMULSIONS. E. C. Cottlet and R. L. F. Chazal (to Societe des Usines Rhone-Poulenc). U. S. 2,498,-792, Feb. 28. Aqueous emulsion of polyvinyl acetate containing dry resin, alkaline sulfonate of an alkylated polynuclear compound and a polypeptide.

CELLULOSE ETHERS. L. H. Bock and P. L. de Benneville (to Rohm and Haas). U. S. 2,498,874-5, Feb. 28. Coupling 3,5-dimethylphenyl methyl ethers of cellulose with diazonium salts.

MOLD. W. G. Kunze. U. S. 2,499,028, Feb. 28. Composition for coating molding forms for plastic mixtures comprising a surface-active wetting agent and an interceptor of ethylene-oxide polymer.

COPOLYMERS. B. W. Howk and L. Plambeck (to Du Pont). U. S. 2,-499,097, Feb. 28. A thermally reversible gel of hydrolyzed vinyl fluoride vinyl acetate copolymers.

BONDING. N. A. de Bruyne (to Rohm and Haas). U. S. 2,499,134, Feb. 28. Uniting two surfaces by coating with aqueous solution of heat-reactive phenol-aldehyde resin, applying a layer of polyvinyl acetal resin, uniting the two surfaces, and heating under pressure.

POLYMERS. R. G. Flowers and L. W. Flowers (to G. E.). U. S. 2,499,187, Feb. 28. A polymer of 2-vinyldibenzothiophene.

POLYMERS. P. L. de Benneville and L. H. Mock (to Rohm and Haas). U. S. 2,499,215, Feb. 28. Quaternary ammonium derivatives from halomethylated polymers of 3,5-dimethylphenyl ethers.

RESIN. P. L. McWhorter (to Haveg). U. S. 2,499,275, Feb. 28. Process for making a furfuryl alcohol resinous product.

MOLDING. W. J. Mead. U. S. 2,499,-325, Feb. 28. Method of obtaining the shape of an object by molding with fluid pressure in a deformable bag.

FLAKING MACHINE. H. F. Cox, Jr. (to American Can). U. S. 2,499,359, Mar. 7. Machine for flaking thermoplastic adhesive material.

RESINS. M. DeGroote and B. Keiser (to Petrolite Corp.). U. S. 2,499,360-1-2-3-4-5-6-7-8-9-70, Mar. 7. Surface-active oxyalkylated derivatives of diphenylolmethanes and oxyalkylene compounds.

PLASTIC RINGS. G. A. Lyon. U. S. 2,499,397-400, Mar. 7. Extrusion method and apparatus for forming thin annular blanks of a thermoplastic material.

TAPE. L. F. Samler (to National Plastic). U. S. 2,499,421, Mar. 7. Method of producing extruded polyethylene tape of uniform cross-section.

FILM. E. D. Fuller (to Visking). U. S. 2,499,486, Mar. 7. Clear film formed from polyethylene, di-2-ethylhexyl phthalate, and carnauba wax.

CELLULOSE DERIVATIVES. J. P. Hollihan, Jr. and S. A. Moss, Jr. (to American Viscose). U. S. 2,499,501 Mar. 7. Mixing viscose with acrylonitrile to react with the cellulose xanthate and convert to cyanoethyl cellulose, and extruding into an acid coagulating bath.

POLYMERS. C. E. Huff and G. A. Zimmerman (to U. S. Rubber). U. S. 2,499,503, Mar. 7. Polymers stabilized with alkali-metal pentaalkyl tripolyphosphates.

PLASTICIZER. J. H. Prichard and L. S. Birnbaum (to Celanese). U. S. 2,499,526, Mar. 7. Cellulose propionate plasticized with mono-amyl naphthalene, diamyl naphthalene, or a mixture of partially hydrogenated isomeric terphenyls.

MOLD. J. J. Booth. U. S. 2,499,565, Mar. 7. A mold for forming all-plastic shoes.

TEXTILE. E. L. Kropa and A. S. Nyquist (to American Cyanamid). U. S. 2,499,653, Mar. 7. Treating protein-containing textile with a polymerizable mixture of maleic anhydride and a lower alkyl acrylic ester and heating to polymerize.

LUBRICANTS. D. D. Coffman and J. F. Lontz (to Du Pont). U. S. 2,499,723, Mar. 7. Lubricants containing copolymers of ethylene and vinyl acetate.

POLYETHYLENE. R. A. Jacobson (to Du Pont). U. S. 2,499,756, Mar. 7. Mixture of polyethylene with hydrocarbon obtained by hydrogenation of carbon monoxide.

POLYSTYRENE. J. D. Surmatis (to Chemical Development). U. S. 2,499,-796, Mar. 7. Producing polystyrene in a solid light-colored rubbery resin by heating to a syrup and then further heating in the presence of an acid catalyst and an organic acid restrainer.

POLYMERIZATION. C. E. Barnes and W. O. Ney, Jr. (to General Aniline). U. S. 2,499,811, Mar. 7. An improved process for preparing color-stable polymer of an α-haloacrylic ester by dehydrohalogenating in solution the corresponding ester of a dihalopropionic acid.

POLYVINYL ALCOHOL. E. Lavin (to Shawinigan). U. S. 2,499,924, Mar. 7. Hydrolyzing polyvinyl acetate by treatment with a catalytic amount of sulfuric acid while dissolved in a mixture of methanol and an aromatic hydrocarbon.

POLYAMIDES. G. R. Sido (to Monsanto). U. S. 2,499,932, Mar. 7. A polyamide resin which is the reaction of at least four reactants.

POLYMERS. R. E. Burk (to Du-Pont). U. S. 2,500,023, Mar. 7. Polymerization of substituted ethylenes containing organic coloring matter in the presence of an azo compound, and in the absence of a peroxy compound.

POLYMERS. J. B. Dickey and T. E. Stanin (to Eastman). U. S. 2,500,025, Mar. 7. A copolymer of p-acetylamino styrene and acrylonitrile.

CELLULOSE ESTER. H. J. Hagemeyer, Jr. (to Eastman). U. S. 2,500,029, Mar. 7. Cellulose ester filaments insoluble in acetone prepared by reacting ketene with cel-

POLYESTER REPORTER

NAUGATUCK PROCEDURE NOW MAKES POSSIBLE LAMINATE CURES WITHOUT OVENS

Well-cured polyester laminates, without external heat, are possible with promoted systems in thicknesses ranging from 50/1000″ to 1″. In addition, the time required to accomplish this can be greatly reduced by using simple paper insulation to utilize the exothermic heat evolved. Illustrative data and a suggested formulation are as follows:

❶ FORMULA

VIBRIN® 112	100 parts
Luperco ATC	3 "
Promoter #3*	0.3 "

*This is an amber-colored liquid.

❷ MIXING PROCEDURE

Weigh the Luperco ATC into the VIBRIN and stir to clarity, avoiding the inclusion of air. Add the Promoter #3 and mix thoroughly for at least one minute; again avoiding entrapment of air.

CAUTION: The pot life of the above formulation is limited to approximately 30 minutes, so lamination must be planned accordingly. If it is desired to either lengthen or shorten the cycle, variations by 0.1 part of Promoter #3 are recommended.

❸ HANDLING PROCEDURE

Place a layer of cellophane on a smooth working base. Pour and spread a portion of the catalyzed-promoted VIBRIN evenly over this. Lay on first layer. Pour on another portion of resin. Lay on next layer, and so on, to desired thickness. Cover with cellophane, and squeegee to obtain uniform saturation throughout the structure. Finish by squeegeeing all air and excess resin from the laminate. Apply ¼″ porous paper insulation if desired. (Metal plate and some weight may be used to achieve maximum surface uniformity.) After 90 minutes even the thinnest laminate will be strong enough to handle and will develop full cure according to schedule in "4" (below).

❹ EFFECT OF INSULATION ON CURE TIME

Cure Time	Recommended Thickness Range for Good Cure (LITO) Insulated	No Insulation
2 Hours	.072–.210 inch	.210–1.00 inch
1 Day	.060–.072 "	.165–.210 "
2 Days	.050–.060 "	.130–.165 "

NEW METHODS—NEW MATERIALS AVAILABLE TO YOU

The laminate cure described above typifies the improved methods and materials which our laboratories are constantly developing. These time-saving, cost-saving procedures are now available to you . . . along with 6 standard VIBRIN polyester resin types (including self-extinguishing and water white). And remember, there's always a Naugatuck technician to solve your special problems.

Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER COMPANY

NAUGATUCK, CONNECTICUT

GET IMPORTANT POLYESTER NEWS AS IT HAPPENS

Without charge, we'll send you *regularly* full reports of our new developments in lamination curing, resin types, dyes and application practices. *Just send coupon today.*

NAUGATUCK CHEMICAL

Plastics Division, Dept. A-1, Naugatuck, Connecticut

Please send me regularly, without charge, your full technical reports.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

IN CANADA: NAUGATUCK CHEMICALS, DIVISION OF DOMINION RUBBER CO., LTD., ELMIRA, ONTARIO

lulose acetate and treating with a solution of formaldehyde in pyridine.

ADHESIVES. L. R. Anthony, B. Frenkel, C. E. Smith, and R. W. H. Wicking (to British Resin Products). U. S. 2,500,054, Mar. 7. Reacting urea with a formaldehyde compound at pH 4.0 to 6.5 to a clear syrup, adjusting to pH 7.0 to 7.5, removing water, adding phenol, resorcinol, or other phenol, and heating to complete reaction.

COPOLYMERS. E. Lieber and W. H. Smyers (to Standard Oil Development). U. S. 2,500,082, Mar. 7. Acetylating styrene-isobutylene copolymers.

MOLDING COMPOSITION. R. M. Banks and R. B. Barnes (to American Cyanamid). U. S. 2,500,113, Mar. 7. Molding compound prepared by contacting aqueous formaldehyde with a silvered ion-exchange resin and condensing with an amino, amido, or phenol compound.

COPOLYMERS. J. B. Dickey, N. J. Bowman, and C. G. Stuckwisch (to Eastman). U. S. 2,500,121, Mar. 7. Copolymers of 2-substituted-1-acyloxybutadiene-1,3 compounds.

SIZE. J. B. Beck. U. S. 2,500,144, Mar. 14. A starching composition comprising polyvinyl alcohol, sodium carboxymethylcellulose, and polyvinyl acetate.

COPOLYMERS. R. F. Boyer (to Dow). U. S. 2,500,149, Mar. 14. Reacting a monovinyl aromatic-monochloro monovinyl aromatic copolymer with a sulfonating agent while swollen with an organic liquid.

RESINS. H. E. Weaver and E. G. King (to Armstrong Cork). U. S. 2,500,222, Mar. 14. Heating a saturated polyester condensate and a modifier comprising a monocarboxylic acid or a monohydric alcohol.

POLYMERS. J. B. Arnold and L. J. Dankert (to Dow) U. S. 2,500 229, Mar. 14. Polymeric 2,2,4-trimethyltetrahydro-quinoline as stabilizer for diene polymers.

MOLD. L. Mazzoni. U. S. 2,500,258, Mar. 14. An injection mold for molding small objects such as beads.

POLYMERIZATION. C. T. Walling and R. H. Snyder (to U. S. Rubber). U. S. 2,500,265, Mar. 14. A polymerizable mixture of unsaturated esters of acrylic or methacrylic acid catalyzed by an alkali metal or alkyl or hydride thereof.

POLYAMIDES. J. Lincoln (to Celanese). U. S. 2,500,317, Mar. 14. Condensing a mixture of β-aminocarboxylic acids.

MOLDING. A. F. Cossette (to Leominster Tool). U. S. 2,500,401, Mar. 14. A nozzlehead for injection molding.

MELAMINE. C. P. Dyer (to Monsanto). U. S. 2,500,489, Mar. 14. Method of manufacturing melamine whereby colorless condensates with formaldehyde are obtained.

POLYMERS. J. B. Arnold and L. J. Dankert (to Dow). U. S. 2,500,597, Mar. 14. Preparation of polymeric 2,2,4-trimethyl-tetrahydroquinoline.

EMBEDDING. B. Axelrod. U. S. 2,500,598, Mar. 14. Casting plastic material in a mold having glass covers and supporting a sheet of material stretched in all directions between the plates so that the plastic adheres to both sides thereof.

COPOLYMERS. T. W. Evans, D. E. Adelson, and L. N. Whitehill (to Shell Oil Development). U. S. 2,500,607, Mar. 14. Copolymers of diallyl phthalate with allyl vinyl phthalate.

GLASS MATS. G. M. Lannan (to Owens-Corning Fiberglas). U. S. 2,500,690, Mar. 14. Apparatus for producing resin-bonded fibrous glass mats.

SHEET MATERIAL. E. G. Williams (to I. C. I.). U. S. 2,500,728, Mar. 14. Production of polymeric resin sheet by continuously polymerizing monomeric material.

RESIN. L. G. Montague (to Devoe and Raynolds). U. S. 2,500,765, Mar. 14. Mixed fatty acid and rosin esters of resinous epoxides.

HINGE. H. Jacobson (to Victor Metal Products). U. S. 2,500,829, Mar. 14. A plastic moldable hinge.

RESINS. C. A. MacKenzie and J. B. Rust (to Montclair Research and Ellis-Foster). U. S. 2,500,842-3, Mar. 14. Mixing a poly-aminotriazine or urea-aldehyde alcohol resin in a solvent with an organo-silicon derivative consisting of the reaction product of an alkyl halide with silicon tetrachloride.

VINYL RESIN. C. H. Alexander (to Goodrich). U. S. 2,500,891, Mar. 14. Polyvinyl chloride resin plasticized with dicyclohexyl phthalate and di-2-ethylhexyl phthalate.

POLYMERIZATION. P. K. Frohlich, B. M. Vanderbilt, and M. W. Swaney (to Standard Oil Development) U. S. 2,500,983, Mar. 21. Emulsion polymerization of a conjugated diolefin in the presence of a tertiary mercaptan and an oily siccative polymer.

MOLDING. K. W. Hall (to Baldwin Locomotive). U. S. 2,501,329, Mar. 21. Thermo-injection molding process and apparatus.

POLYSILOXANES. R. H. Krieble and J. R. Elliott (to G. E.) U. S. 2,501,-525, Mar. 21. Preparing a polymer from a mixture of organohalosilanes.

POLYMERIZING STYRENE. L. D. Cook, Jr. (to International Detrola). U. S. 2,501,562, Mar. 21. Polymerizing styrene in the presence of a polyvinyl alcohol-alkyl aldehyde reaction product.

MOLDING. G. S. Bohannon (to Crown Machine and Tool). U. S. 2,501,595, Mar. 21. A pre-plasticizing unit adaptable for use with a plastic molding machine.

RESINS. C. F. Feasley (to Socony-Vacuum). U. S. 2,501,600, Mar. 21. Viscous liquids and solids produced by heating aromatic hydrocarbons, formaldehyde, and a solid inorganic catalyst.

POLYMER. R. C. Morris and A. V. Snider (to Shell Development). U. S. 2,501,610, Mar. 21. A polymer of diallyl-3,5-dimethylphthalate.

RESINS. W. O. Ney, Jr. (to General Aniline). U. S. 2,501,647, Mar. 21. Method of forming resinous products from haloacrylic acid compounds.

LIGNIN RESINS. R. N. Evans and A. P. Ingrassia (to Masonite). U. S. 2,501,665-6, Mar. 28. Thermosetting resins prepared by dissolving alkali-soluble lignin in an ether, adding an amino-triazine and formaldehyde, and reacting with heat.

POLYMERIZATION. W. B. Reynolds and E. W. Cotton (to Phillips Petroleum). U. S. 2,501,692-3, Mar. 28. Polymerizing an ethylenically unsaturated organic compound in aqueous dispersion in the presence of a diazo thio ether.

now TANK TRUCK DELIVERY

OF Barrett* "elastex"

28-P PLASTICIZER

For your greater convenience—and as a saving to you—we now make express tank truck deliveries of "ELASTEX" 28-P Plasticizer (Dioctyl Phthalate), to points within a 100-mile radius of our stations at Malden, Mass., Edgewater, N. J., and Philadelphia, Pa.; also full transport truck loads of one or more Barrett Plasticizers to points within 400 miles of Philadelphia. Convenient stock points provide prompt delivery service in drums for other areas. Phone, wire or write.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd.,
5551 St. Hubert St., Montreal, Que.

*Reg. U. S. Pat. Off.

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Electronic Engineering Master Index 1947—1948." Edited by John F. Rider.

Published by Electronics Research Publishing Co., Inc., 480 Canal St., New York 13, N. Y. 339 pages. Price $19.50.

In this third volume of a series covering the electronic and allied engineering literature published throughout the world since 1925, more than 18,000 new entries are presented. The book indexes over 230 of the major international scientific magazines, journals, and proceedings, including patents issued by the U. S. Patent Office and declassified documents published by the U. S., British, and Canadian governments.

Much of the important war and postwar research in electronics, atomic physics, and allied fields is listed here for the first time.

"Chemical Inventions and Chemical Patents," by Edward Thomas.

Published by Clark Boardman Co., Ltd., 11 Park Place, New York 7, N. Y. Price $16.50.

Designed to aid patent attorneys, research chemists, and engineers, the book emphasizes the hazards which may have to be overcome in securing successful chemical patent applications. Many solutions are suggested for specialized situations, and court decisions are cited for all statements made.

The publication is broken down into six sections as follows: surveying prospective patent rights in an invention; appraising patent rights; formulating patent rights; construing formulated patent rights; acquiring formal patent rights; and exploitation of acquired patent rights.

"Principles and Practice of Flow Meter Engineering," by L. K. Spink.

Published by The Foxboro Co., Foxboro, Mass. 416 pages. Price $7.00.

Much new material has been added to this seventh edition, making it an up-to-date handbook on all phases of flow engineering. Information is given on calculating an orifice, flow nozzle, Venturi tube, Pitot tube, and a pipe elbow. The common pressure tap locations are discussed, and viscosity corrections are furnished.

Equations and curves for calculating throttling orifices to be used at critical pressure drops are a new addition, along with fluid flow measurements in metric units, a table of corrections for barometric pressures, a table of pressure multipliers, and pages of examples of typical calculations conducted in connection with flow meter engineering.

"Modern Silk Screen Printing," by Victor Strauss, illustrated by Edith Strauss.

Published by Pied Piper Press, 225 Lafayette St., New York 12, N. Y. 28 pages. Price $1.50.

The youngest of the graphic arts is fully discussed, from both the printing and consuming end, in this reprint of an article prepared especially for the Ninth Graphic Arts Production Yearbook. Covering such topics as dyes, drying methods, printing, and uses of silk screening, the text shows the great variety of effects obtainable and suggests particular applications for which the silk-screening process is best suited.

Suppression of hydraulic line shock—Dealing with the causes of line shock, commonly known as water hammer, this four-page folder discusses characteristics and detrimental effects of this undesirable condition and provides a formula for determining the magnitude of shock occurring under any situation. In addition, the bulletin explains the use of the company's accumulator as a means for suppressing line shock. *Greer Hydraulics, Inc., 454 18th St., Brooklyn, N. Y.*

Selling with scale models—Uses of plastic scale models in advertising and sales promotion are described in a four-page folder which suggests products such as kitchen equipment, cars, and machinery that can be merchandised profitably. The complete services offered by the company, including design assistance, tooling, fabrication, packaging, and shipping of finished scale models, are presented. *Ideal Models Co., 17262 Moran Ave., Detroit, 12, Mich.*

Lumite woven fabrics—Designed primarily to supply technical information about Lumite products to manufacturers, this 22-page booklet, describes the various qualities and uses of Lumite insect screening, decorative and upholstery fabrics. *Lumite Div., Chicopee Mfg. Corp., 40 Worth St., New York 13, N. Y.*

Acrylic molding powders—This 16-page booklet gives the latest information on a new line of acrylic molding powders. Physical-property data and end-use information on three varieties of the material—Plexiglas VS, VM, and V—are covered in the text which also includes specific sections on weather resistance, dimensional stability, strength, electrical insulation, machinability, and chemical resistance. Photographs of consumer applications illustrate the materials' properties of clarity and brilliance. *Rohm & Haas Co., Washington Sq. Philadelphia 5, Pa.*

Synthetic resin report—Bulletin No. 44—Research data authored by the Scientific Intermediates Commission of I. G. Farbenindustrie, various hitherto unprocessed patent applications, and many manufacturing processes are listed in this 13-page compilation of German research and manufacturing processes in the field of synthetic resins and resin intermediates. Each of the 66 new reports listed, with the exception of the manufacturing directions, is summarized in an abstract and identified by title, author, PB number, and patent application number. *Research Information Service 509 Fifth Ave., New York 17, N. Y.*

Plywood today—reprinted from the January issue of *American Builder*, this 30-page article is a re-appraisal of the material that rose from the role of a building specialty to a building commodity. Profusely illustrated and diagrammed sections deal with the individual applications

(Continued on p. 117)

of flooring, sheathing, and roof decking for interior and exterior use, in concrete forms, in prefabricated housing, and on the farm. *Douglas Fir Plywood Association, Tacoma Building, Tacoma 2, Wash.*

Hastelloy alloys—Designers, engineers, and fabricators who are faced with the problem of selecting a high-strength material that will withstand severe chemical corrosion will find this informative 40-page booklet on Hastelloy alloys of interest. In addition to giving a complete history of each of the four alloys, there are tables recording their resistance to six common corrosive media; their strength, toughness, and machinability; and properties at room temperature as well as at elevated and sub-zero temperatures. Graphs compare the properties of the Hastelloy alloys with those of four other common construction materials. Procedures are suggested for welding, heat-treating, hot and cold working, surface preparation, machining, and grinding. *Haynes Stellite Div., Union Carbide and Carbon Corp., Kokomo, Ind.*

Economic cycles—Examining the financing of the five great wars in which the United States has been involved, this 80-page report seeks to show what effects the monetization of government deficits has had on our economy.

Wholesale prices and inflation during each of the war periods are covered, along with the contributing causes to business failures and a general summary of trends in business failures. An accompanying chart presents the relationship between the trend of wholesale prices and business failures. *Dun & Bradstreet, Inc., 290 Broadway, New York 7, N. Y.*

Proportioning system—(Bull. No. 3849)—Reporting the company's new proportioning and blending system, heart of which is the Conveyometer—a self-testing feeder-weigher for stream delivery of small, crushed, granular or non-flushing, ground materials—is this three-color, six-page bulletin. Used for proportioning any number of materials in a continuous process of mixing and blending, the unit is also suitable for delivering a prescribed tonnage of material by weight for

recording the delivered weight. *Richardson Scale Co., Clifton, N. J.*

The technique of coloring styrene—Recent developments in the field have made simple techniques of coloring styrene available, and the advantages to the user of coloring his own styrene are set forth in this four-page folder. The types of colors supplied by this company are described in full with information as to the proper techniques for mixing and application on different grades of the material. Necessary equipment is also discussed. *Ferro Enamel Corp., 4150 E. 56th St., Cleveland 5, Ohio.*

Pulverizer—The latest in the company's line of pulverizers for the plastics industry, the Model B Pulva-Sizer, is described pictorially and graphically in a four-page folder. The unit is recommended for pulverizing a wide variety of materials used chiefly in the process industries, such as chemicals, pigments, dyestuffs, natural and synthetic resins, molding compounds, gums, and fillers, and is also adapted to the dispersion of pigments and dyes. Construction specifications of the machine are given. *Pulva Corp., 550 High St., Perth Amboy, N. J.*

Industrial control devices (Catalog 8303)—Several important additions to the firm's line are included in this 64-page catalog which presents over 100 different models of non-indicating electric, electronic, and pneumatic controllers that have innumerable uses in industrial applications. These new machines include electronic temperature controllers, pneumatic insertion-type temperature controllers, magnetic starters and contractors, heavy-duty pneumatic positioning motors, pneumatic automatic reset relays, and electric step controllers. *Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Aves., Philadelphia 44, Pa.*

Vacuum calculator—A handy desk-size slide-rule device has been developed to determine the needed pump capacity to evacuate a given volume to a specified vacuum in a given time; the time required to evacuate a given volume to a specified vacuum with existing vacuum pumps; vapor pressures of water at various temperatures; boiling points of solvents under vacuum; and capacity of round tanks in both cubic feet per foot and gallons per foot. Copies of the rule are available at 50 cents from *F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia 20, Pa.*

Chart for ram speeds and stroke times—Recognizing the fact that most rubber and plastic molding firms are keenly interested in increasing their ram speeds, this company has prepared a chart to be used in conjunction with its two-pressure valves. The chart gives ram speeds in inches per minute and stroke time in seconds at pressures of 100 p.s.i. to 1000 p.s.i. for ram diameters of 8 to 36 inches. *The Sinclair-Collins Valve Co., 454 Morgan Ave., Akron 11, Ohio.*

Plastics consultation—A discussion of the services available to molders, extruders, and fabricators of plastics abroad is contained in this 16-page brochure which illustrates some of the foreign factories that have been equipped by this organization. *Alfred A. Rosenthal, 3 Park Row, New York 7, N. Y.*

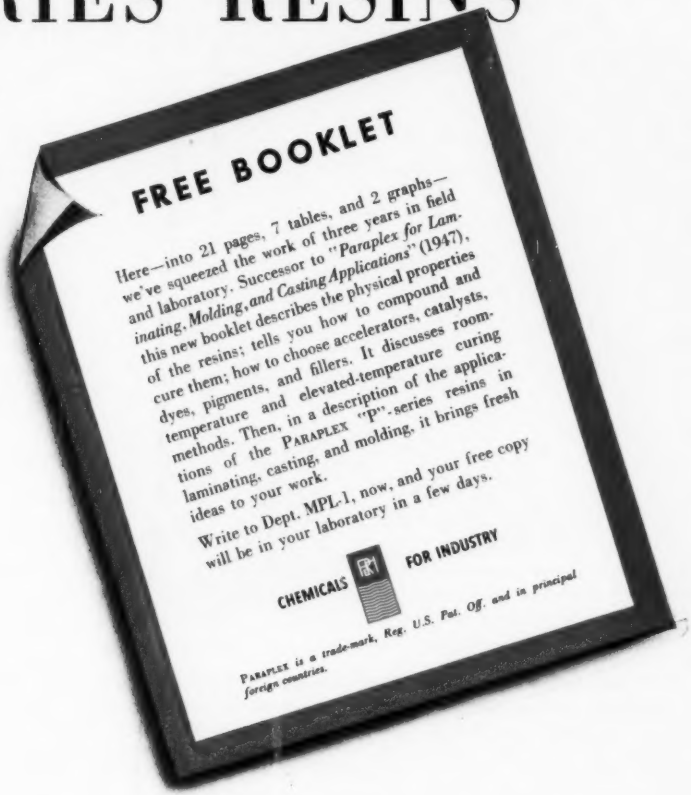
Electrical developments of 1949—The company's achievements last year in science, engineering, and manufacturing are recorded in a well-illustrated, 50-page booklet which, although outlining the electrical, mechanical, and chemical developments in one concern, nevertheless indicates trends and construction of the electrical industry as a whole. *General Electric Co., 1 River Rd., Schenectady, N. Y.*

Drill and tap chucks—Designed for driving straight shank drills, reamers, and similar tools, the company's line of drill chucks is described and illustrated in this eight-page bulletin, which also covers two types of tap chucks and center-drill drivers. *Scully-Jones & Co., 1982 S. Rockwell St., Chicago 8, Ill.*

Stock molds—Specialist in custom molded items, this company has itemized its line of stock molds of radio, instrument, and control knobs in a 14-page booklet. Specifications for each size of the various types of knobs are tabulated, along with drawings of each piece. *Kurz-Kasch, Inc., 1421 S. Broadway, Dayton, O.*

The

PARAPLEX "P" SERIES RESINS



ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

WASHINGTON SQUARE PHILADELPHIA 5, PA.

NEW MACHINERY AND EQUIPMENT

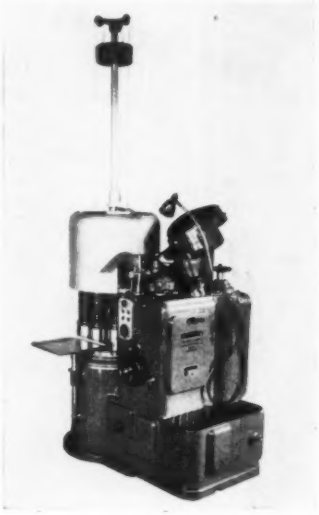
DRILL PRESS FEEDS—Production of new automatic air-power feeds for small drill presses has been announced by The Beckett-Harcum Co., Wayne Rd., Wilmington, Ohio. In addition to providing proper thrust and correct drilling action for practically any size drill working in any drillable material, the new air feeds include instant reversal of thrust on break-through; require no hydraulic checking devices for light work; maintain an accuracy of 0.001 in. on depth control; can tap highly accurate threads without employing a tapping head; and have a speed of stroke infinitely variable in either direction.

Standard or heavy-duty models of the equipment come in four feed types: drill; drill with dwell; drill, chip clean, and dwell; and drill and tap. On a drill press equipped with the drilling-tapping feed model, drilling operations can be changed over to tapping by simply removing the drill and placing the tap directly in the drill chuck or multiple-spindle drill head.

ROTARY PRESS AND PREFORMER—Two pieces of equipment for use in the manufacture of parts having internal or external screw threads and made of thermosetting synthetic resins are currently being distributed in this country by Moldcraft, Inc., 1505 W. 41st St., Baltimore 11, Md. Developed by Tavannes Machines Co. S.A. of Tavannes, Switzerland, the two units are an automatic 5-ton molding press and an automatic tabletting machine.

The molding press, which is designed for production of tubes, pots, control knobs for electrical equipment, and closure caps for bottles, was developed as a universal, low-die-cost unit, which will mold threaded parts up to 3 in. in diameter, knock out pieces up to a height of 1 3/16 in., and both unscrew and knock out simultaneously. For production of parts with screw threads, capacity ranges from 900 to 2700 parts per hour, while special models for handling pieces without screw threads have an hourly output of from 225 to 900 parts.

The operating principle of the press is based on 10 hydraulic cylinders, working independently of one another, arranged around the circumference of a drum with a vertical axis. Each cylinder holds a die



with a counter plunger. A driving mechanism gives the drum an intermittent anti-clockwise rotary movement. Pressure on the ram is adjustable up to 5 tons. Working cycle is from 4 to 16 seconds.

The molding press is fed by round preforms which are made by a separate tabletting machine. This unit has a maximum pressure of 10 tons, and three adjustable speeds: 18, 27, and 40 strokes per minute. Features of the equipment include: a new type agitator; accurate production up to 9600 tablets per hour; a special device permitting air to escape when compressing fine powders; and a safety accessory to avoid overloading. On request, dies are equipped with an electric heating element which slightly hardens the surface of the tablet, thus preventing breakage and formation of dust when handling tablets.

AUTOMATIC CYCLE CONTROLLER—Insurance of uniform molding cycles is the major objective of the Timemaster, an automatic cycle controller manufactured by T. H. & J. Daniels, Ltd., Stroud, Glos., England. When the process timer is set, the press will perform identical cycles, including pauses, over a period adjustable from 0 to 10 minutes. The unit will control an ejector or a transfer cylinder as well as the main cylinder. During operation, the press control valves are operated automatically by air cylinders governed by four valves. The instrument consists of a circular case containing a cure cycle control clock and a camshaft driven by a motor.

CONTINUOUS-FLOW PREHEATER—Preheating of thermoplastic or thermosetting resins at an even temperature regardless of the preform's shape is achieved on the Cavitron Cavity Resonator, a continuous-flow preheater designed and made by Short Wave Plastic Forming Co., 2921 W. Alameda Ave., Burbank, Calif. Plastic preforms first pass through an electro-static field on a conveyor belt and, after being brought to a given temperature by the equal distribution of radio-frequency throughout the mass, they are directed to the molding press without the necessity of handling before molding. The unit accepts any standard plastic blank up to 42 in. wide, and any length of roll stock up to the same width.

AIR-LINE FILTER—To supply the filtered air required for efficient operation of air-powered tools, Keller Tool Co., 4700 Hall St., Grand Haven, Mich., has developed a new air-line filter. The filter element, of porous sintered bronze, filters out all particles of dust down to 0.001 inch. A series of baffles in the bottom of the unit traps condensation and moisture in a sump from which the accumulated waste can be

NEW! VAN DORN 2-ounce Injection Press

Utilizing the same rugged construction with doubled capacity, this Van Dorn press now offers you more profitable production with molding time reduced 30% to 50%. The new press has a larger heating cylinder with more plasticizing capacity; greater injection pressure; faster cycling due to larger motor and pump; and a unit for cooling hydraulic oil.

Surprisingly low in price, this versatile press uses inexpensive molds, can be set up by one man in 20 minutes, and operates 8 hours for under 1 dollar!

With all these features, this remarkable press is *unequalled* in the 2-ounce capacity class for molding practically all thermoplastics, including nylon.

We make Mold Bases for Van Dorn Presses.

***Free* BULLETIN**
contains complete data
. . . Write for it NOW!

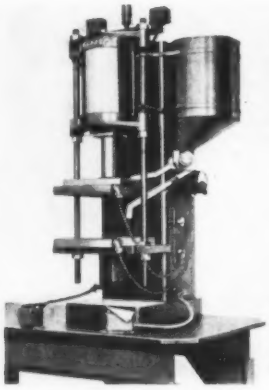
THE Van Dorn IRON WORKS CO.
2687 EAST 79th STREET • CLEVELAND 4, OHIO

quickly removed through a drain cock. The filter has a rated capacity of 40 cu. ft./min. and a pressure drop of 1 lb./sq. inch.

SPRAY GUN—Two new construction features have been incorporated in a recently developed paint spray gun produced by Eclipse Air Brush Co., 390 Park Ave., Newark 7, N. Y. Named the Gat-2, the new gun has a four-finger trigger said to permit an operator to use the equipment for long periods without developing finger fatigue.

Another feature is the "47" controllable nozzle which operates on the Eclipse low pressure principle, and is claimed to be particularly effective in reducing fumes, minimizing air consumption, and saving paint. Among the advantages stressed for the device is accuracy in control whereby a spray pattern may be produced varying from the size of a half-dollar to a swath more than 12 in. wide.

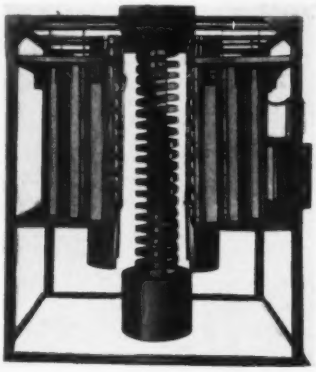
ALKYD MOLDING PRESSES—A special line of molding presses designed to handle alkyd resins has been introduced by Elmes Engineering Div., American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, Ohio. The miniature automatic



presses, trade-named Minimatic, have five cylinder capacities; 3- and 6-ton for air application, and 0.3-, 1.2-, and 2-4-ton for hydraulic service. All cylinders are interchangeable in the basic frame. Controls for automatic or semi-automatic operations are provided.

Press operation is controlled by a single operating valve. In the air cylinders, operation is double acting. However, by use of a three-way operating valve with hydraulic cylinders, constant air pressure returns the cylinder upward, resulting in considerable power saving.

SPIRAL POWDER HEATER—Vertical elevation of plastic powders, which are being preheated prior to injec-



tion or extrusion molding, is the fundamental advantage of the Spira-Veyor, a new infra-red appliance introduced by The Miskella Infra-Red Co., E. 73rd and Grand Ave., Cleveland 4, Ohio. Capable of heating materials in a thin, free-flowing web at any setting desired from room temperature to 400° F., the new unit features a spiral, vibrating ramp whose mean travel distance from inlet to outlet is 8 feet.

An important part of the equipment is an intermittent timer which delays delivery of materials in process in order to drive out more moisture and to cut down the electrical load required to perform a given heating operation. All metals of the spiral—which pulsates at 3600 vibrations per minute—are completely exposed to the heat which tends to increase heating efficiency. The Spira-Veyor comes equipped with a portable hopper-feeder large enough to handle a full-size drum of plastic powder.

ROUND PUNCHES—Supplementing an established selection of round tool steel punches is a complete new line of standardized, interchangeable round punches made of high-speed steel which has been introduced by Richard Bros. Div., Allied Products Corp., 1560 E. Milwaukee Ave., Detroit 11, Mich. The punches incorporate the firm's interchangeable feature in which a ball-bearing lock in the retainer engages in a ball seat on the punch shank, providing secure positioning both radially and vertically.

TUMBLE-MIXER—Adjustable turntable clamps are a feature of the new portable Universal Tumbler-Mixer which makes the device adaptable to handling many standard and odd-shaped containers. Developed by Rampe Mfg. Co., 3029 Prospect Ave., Cleveland 15, Ohio, the machine will tumble or mix any material. It tilts through a full 90° arc so that work can be performed at the best angle. The unit, which can be quickly moved from one job to another, is said to be particularly adaptable to adding colors to plastic granules.

STATIC CONTROL—Control of fire and explosion hazards caused by static electricity is said to be effectively accomplished by the Takk Static Control, a new piece of equipment introduced by The John Hewson Co., 106 Water St., New York 5, N. Y. Of particular value to plastic-coating operations involving highly volatile solvents, as well as many other plant applications, the equipment is being concentrated in areas where vapors of isopropyl acetate, acetone, methyl ethyl ketone, or toluol are present, and has been tested in connection with other explosives.

PULVERIZER—An impact- or swing hammer-type pulverizer for various grinding and blending applications in the plastics industry has been introduced by Pulva Corp., 550 High St., Perth Amboy, N. J. Known as the Model B Pulva-Sizer, the new unit features a twin-screw arrangement for feeding unground material directly to the face of the hammers. Feed screws are available in three diameters to handle a wide range of material from free-flowing powders up to pieces about 3 in. in size. The unit is said to be particularly well suited for either fine grinding of resins or granulating molding compounds.

Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants

Materials	*Total prod'n. first 3 mos. 1950*	*Total sales first 3 mos. 1950*
CELLULOSE PLASTIC:[a]		
Cellulose acetate and mixed ester plastics:		
Sheets, continuous:		
Under 0.003 gage	2,629,245	2,510,690
0.003 gage and over	1,979,408	1,971,243
All other sheets, rods, and tubes	1,087,461	804,835
Molding and extrusion materials	17,191,329	16,336,911
Nitrocellulose		
Sheets	1,406,965	1,419,531
Rods and tubes	534,923	269,287
Other cellulose plastics[b]	3,190,257	3,217,825
PHENOLIC AND OTHER TAR ACID RESINS:		
Laminating	14,416,222	9,362,930
Adhesives	7,295,935	6,716,265
Molding materials[a]	52,408,467	42,248,525
Protective coatings (containing less than 10% modifier)	4,687,594	3,682,931
Miscellaneous uses, including casting	13,534,111	13,786,599
UREA AND MELAMINE RESINS:		
Adhesives	16,309,147	14,841,068
Textile- and paper-treating resins	7,366,049	5,939,163
Protective coatings, modified and unmodified	6,258,294	5,612,331
Miscellaneous uses, including laminating and molding[c]	14,457,386	13,380,458
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:		
Molding materials[a]	55,876,952	59,359,117
Miscellaneous uses[d]	11,727,766	10,398,550
VINYL RESINS:		
Sheeting and film, including safety-glass sheeting[a]	54,915,627	48,008,941
Adhesive (resin content)	3,909,330	3,609,314
Textile- and paper-treating resins, including spreader and calendering types (resin content)[e]	10,564,818	9,922,548
Molding material (resin content)	26,972,529	25,564,542
Miscellaneous uses (resin content)[e]	5,808,644	3,437,198
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:		
Molding materials[a, f]	13,173,390	12,331,804
Protective coatings[g]	16,479,049	16,302,502
All other uses[h]	48,691,693	47,606,274

[a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods, and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data on protective coating resins; these data are included with miscellaneous coating resins to avoid disclosure of

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

February 1950		March 1950	
Production	*Sales*	*Production*	*Sales*
921,490	812,274	847,765	860,152
617,531	622,349	693,045	690,921
335,934	297,190	342,512	284,299
5,398,826	5,237,721	6,405,349	6,001,122
444,539	462,576	518,160	504,321
101,673	83,223	131,611	80,625
1,167,958	1,087,625	1,197,704	1,188,319
4,627,628	3,137,039	5,140,560	3,377,536
2,149,556[1]	1,943,106[1]	3,305,351	3,046,118
16,363,841	13,169,532	19,144,704	15,167,062
1,534,613	1,204,082	1,668,694	1,303,230
4,312,065	4,575,874	5,267,418	5,152,347
5,462,398[1]	5,296,270[1]	5,983,488	4,869,119
2,270,187	1,927,692	1,917,606	1,348,180
1,916,516[1]	1,673,310[1]	2,438,255	2,338,790
4,789,021	4,176,715	4,665,066	4,909,065
16,397,808	19,193,614	22,724,146	22,627,472
3,843,762	3,485,231	4,307,452	3,918,034
17,771,973	16,882,159	20,676,388	18,796,147
1,238,632	1,172,824	1,472,670	1,330,838
3,097,449	3,309,767	3,960,329	3,740,975
7,683,414	8,341,872	9,532,681	9,287,072
1,637,278	1,005,265	1,989,375	1,251,963
3,901,741[1]	3,990,085	4,736,781	4,318,193
5,326,328[1]	5,161,124[1]	4,919,464	4,987,286
16,107,048[1]	15,498,672	16,011,448	16,298,825

operations of individual companies. [e]Includes data for spreader and calendering type resins. [f]Includes data for acrylic, polyethylene, nylon, and others. [g]Includes data for coumarone-indene, petroleum, silicone, and other protective coating resins. [h]Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum, silicone, and others for miscellaneous uses. [1]Revised.

Britain

COMPETITION between natural rubber and p.v.c. is increasing and it is becoming evident that if rubber prices drop a fraction from the present level of 1/8*d* to something approaching 1/ 6½*d*, the present price for British p.v.c. polymer, the plastics industry will have to face quite formidable competition.

Molded souvenirs.—The molding section of the plastics industry is becoming souvenir conscious as it realizes the extent of the business to be obtained in molding the many millions of plastics souvenirs to be sold in the 1951 Festival Exhibition on the South Bank of the Thames. It is expected that most of the badge types of souvenirs will be either styrene or cellulose acetate.

TV tube guard—An interesting development in television is the production of implosion guards made of neutral tint Perspex acrylic sheet. Not only do these act as efficient guards, but the neutral tint increases contrast, prevents glare, and makes daylight viewing as efficient as viewing in the dark.

Molding equipment—British Industrial Plastics Ltd., Britain's leading producer of urea and melamine molding powders, has fathered a new concern, B.I.P. Engineering Ltd., to manufacture molding presses and other equipment for the plastics industry. One of the first production presses, a new-type downstroking oil hydraulic press for compression and transfer molding, was shown at the British Industries Fair.

Polytetrafluoroethylene — British Ministry of Supply has stated that the home production of polytetrafluoroethylene is at present insufficient to meet the industry's requirements and that the export of this metal will not be permitted until the manufacture is stepped up considerably. It is likely that American polytetrafluoroethylene will be imported to meet the shortage.

Extruded bottles—Squeezable polyethylene bottles made by Cascelloid Ltd., Leicester, under the Plax patents are meeting growing competition from similar types of bottles made by modified extrusion molding techniques. At least two manufacturers have made notable progress in modifying existing extruders so as to produce good qual-

*Reg. U. S. Pat. Office.

8 Important Reasons—

why it pays Material Manufacturers, Compounders and Molders

to insist on

CADMOLITH*

REDS AND YELLOWS

(Cadmium Red and Yellow Lithopone)

FOR PLASTIC MATERIALS

- Soft and Easy to Grind
- Insoluble in all Vehicles
- Alkali and Acid Resistant
- High Heat Resistance
- Non-Fading to Light
- Non-Bleeding
- Opaque
- Wide Range of Shades

Whether you are a material manufacturer, a compounder of new or old materials or a plastic molder or coater . . . you can always depend on Glidden Cadmolith* Colors for the finest results in red and yellow shades. Glidden leadership in research has given these superior colorants properties which not only make your coloring job easier, but produce the finest, most lasting colors in powders and products made from them.

Send for Folder giving complete details, with color chips. Write The Glidden Company, Chemical and Pigment Company Division, Union Commerce Building, Cleveland 14, Ohio.

Where a higher degree of opacity is required, *Pure* Cadmium Reds are available in the same range of shades as our Cadmolith* Red.

*Trade Mark Registered

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

CHEMICAL & PIGMENT COMPANY DIVISION

Baltimore, Maryland • Collinsville, Illinois • Oakland, California

SUNOLITH* Lithopone

ASTROLITH* Lithopone

ZOPAQUE* Titanium Dioxide

TITANOLITH* Titanated Lithopone

ity vials and bottles at commercially interesting production rates.

Multi-color extrusions—A good demand is being built up in Britain for multi-colored p.v.c. strips and sheets which can be manufactured up to 54 in. wide. The number of colors depends on the number of machines teamed up to operate through a single crosshead. These novelties are also proving attractive to continental buyers who are also interested in the extruders used for producing them.

Insulators—More and more farmers are using polyethylene insulators for electric cattle fences. These are extremely tough, unequalled as insulators, and possess excellent weathering characteristics when they contain carbon black. These polyethylene insulators are injection molded. —*Howard Williams*

France

Etablissements Drouet, Paris, has entered into a technical aid agreement with Panelyte Div., St. Regis Paper Co., New York, N. Y. Under the terms of the agreement, Drouet is entitled to Panelyte production and sales rights in France and to the use of Panelyte patents, machine designs, and formulas used in making high pressure laminates.

The agreement is similar to previous arrangements between Panelyte and Ashdowns, Ltd., England, and Skanska Attifabriken, AB., Sweden. By producing the laminate themselves, the three European companies can make Panelyte available to their customers at a lower price than would be necessary if the material were shipped from Panelyte's plants in the United States.

Australia

Extruded cellulose acetate butyrate piping is being widely used in Australia in place of galvanized iron pipe in domestic and industrial water systems. The Tenite II pipe is extruded by Parfrey Plastics Pty. Ltd., East Melbourne, Victoria.

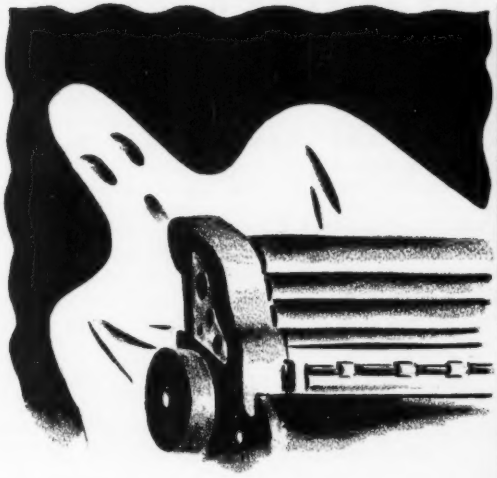
The butyrate pipe was developed partly because of shortages of other materials and partly because the waters in Australia, particularly those used for irrigation and for watering livestock, are highly mineralized and have a corrosive effect on iron pipe.

Parfrey is extruding butyrate pipe in sizes of ¾, 1, 1¼, 1½, and 1¾ in. and is producing sleeves and other fittings as well as a specially developed acetone base adhesive for use in joining the pipe.

Special equipment has been developed to coil ¾- and 1-in. O.D. piping with 0.080 wall thicknesses in lengths up to 400 ft. for ease of transportation and to reduce the number of joints made in the field on long runs.

Indonesia

The first plastics plant in Indonesia has been opened by Indonesian Polymer Products. The factory, which is located in Bandung, was built and is operated under the direction of Dr. J. C. L. Schlimme, a former member of the Plastic Institute T.N.O. of Delft, Holland. At present the company is making insulating materials for the electrical industry, and plastics products for paper factories, textiles works, and infirmaries.



DO GHOSTS HAUNT YOUR PRESS?

By feeding your press a diet of Atlas' newly developed fast-drying inks, you can exterminate the pesky, expensive "ghosts" that plague your vinyl film. Regardless of the speed at which you do your printing, these remarkable inks will not mark-off or migrate, and, what's more, their amazing drying speed allows you to omit interleafing.

Atlas can supply you with a complete concentrated color line for multi-color printing with photo-engraved rolls, and also a full assortment of standard vinyl inks for roller and screen printing.

Extensive on-the-job tests have established the excellent stability and fine printing quality of Atlas ink products under all printing conditions.

Don't accept our say-so . . . just accept our samples for making trial runs. Send for them now.

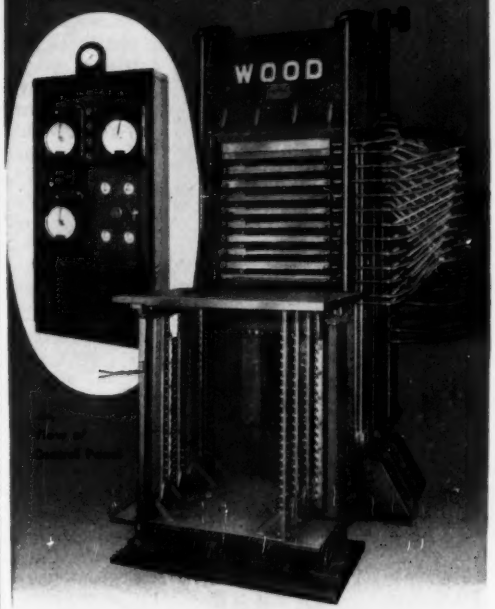
Now! non-curling inks for Blotch patterns.

ATLAS COATINGS CORP.

5-35 47th Ave., Long Island City 1, N. Y.

AUTOMATIC

precision polishing!



This 880-ton R. D. Wood hydraulic platen press is designed for precision polishing and laminating of plastic sheets. Press platens measure 44" x 54". Equipped with a loading and unloading elevator of 20 openings (twice the number of press openings) the press is completely automatic. Adjustable control of operating cycle, pressure application, platen heating and cooling temperature are all controlled from a central panel board at the operator's station. A recorder automatically records actual temperature and pressure during the entire operating cycle. This precision press provides the extreme accuracy, positive pressure and temperature control required for repetitive production of exactly uniform sheets, in conformance with the most rigid specifications of thickness, flexibility, and coloring.

Different size and pressure ranges are available. Write without obligation for information.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE
ACCUMULATORS — INTENSIFIERS

Est. 1803

R. D. Wood Company

Toy Television Set

ENTHUSIASM of youngsters for television points to almost sure-fire success for a toy TV set manufactured by Hollywood Toy Television Corp., Chicago, Ill. Consisting mainly of plastics parts, the electrically operated set projects a special-type, 16-mm. film providing a 5-min. program of single frames.

The TV set's housing, 10 by 6 by 7 in., is molded in one piece of red styrene. The housing weighs 14 oz. and is run on a 16-oz. machine. Added strength and rigidity are provided by vertical ribs. Also of styrene is a one-piece bezel and screen window which is molded of clear transparent material. A solvent-cutting agent is sprayed on the back of this window, etching it and giving the screen the necessary translucent surface for projection. These styrene parts, the black acetate "funnel" into which the film strip is fed, the acetate support for the mirrors of the projection system, and the acetate lens barrel are made by Industrial Plastics Co., Chicago, Ill.

Supporting the working mechanism is a shelf molded of general-purpose phenolic by Albert Zollinger, Inc., Downers Grove, Ill. Zollinger also produces the phenolic film-actuating cam.

Other plastics elements include a white urea knob on the switch. Terminals which eliminate the necessity of soldering the wires, are fabricated by Aircraft-Marine Products, Inc., Harrisburg, Pa., using polyvinyl chloride tubing supplied by Irvington Varnish & Insulator Co., Irvington, N. J.

Molded styrene cabinet of junior-sized set is styled functionally

Bottom view of cabinet shows the phenolic mechanism support. In front, left to right, are styrene window and bezel, support, acetate part holding mirrors

ACCOMPLISHMENTS

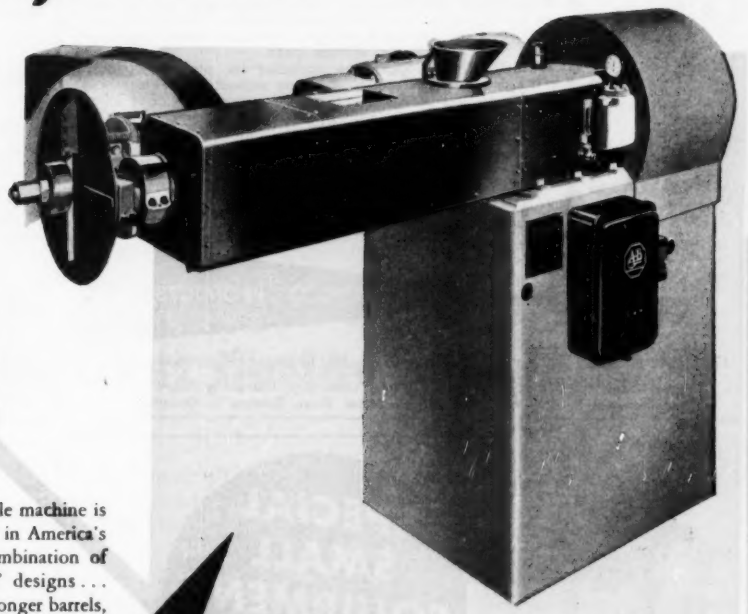
PROVE THE WORTH OF WELDING ENGINEERS'

Compounder-Extruder

FINISH EXTRUDES

COMPOUNDS PELLETIZES

RECLAIMS SCRAP



This compact, versatile machine is accomplishing more and more in America's key industrial plants. The combination of exclusive Welding Engineers' designs . . . counter rotating dual worms, longer barrels, vacuum extraction, and other features . . . make it possible to compound and extrude from virgin materials in one fast single-pass, continuous operation. Production costs tumble further because this unique machine accepts trims and scraps just as eagerly as it does raw materials

The Compounder-Extruder* can produce your finished products with close tolerances and accurate finishes faster, better and more economically. We would like to prove it to you. There is a size to fit every need.

*Patents Pending and Issued

With compounding, extracting, and extruding assigned to ONE super-efficient machine requiring but ONE time-saving operation, it is easy to understand why so many of America's Leaders in the Plastics Industry are investing in this amazing triple-action Welding Engineers' development. Write for production facts and figures.

MACHINERY DIVISION

WELDING ENGINEERS, INC.

NORRISTOWN, PA.

SEND YOUR COMPOUNDING AND EXTRUDING PROBLEMS TO US!

MANUFACTURERS OF IMPROVED MACHINERY FOR THE PLASTIC, CHEMICAL AND PETROLEUM INDUSTRIES

COURTESY CELANESE CORP. OF AMERICA

Eyelet rubbed on hill-and-dale cellulose acetate record produces sound

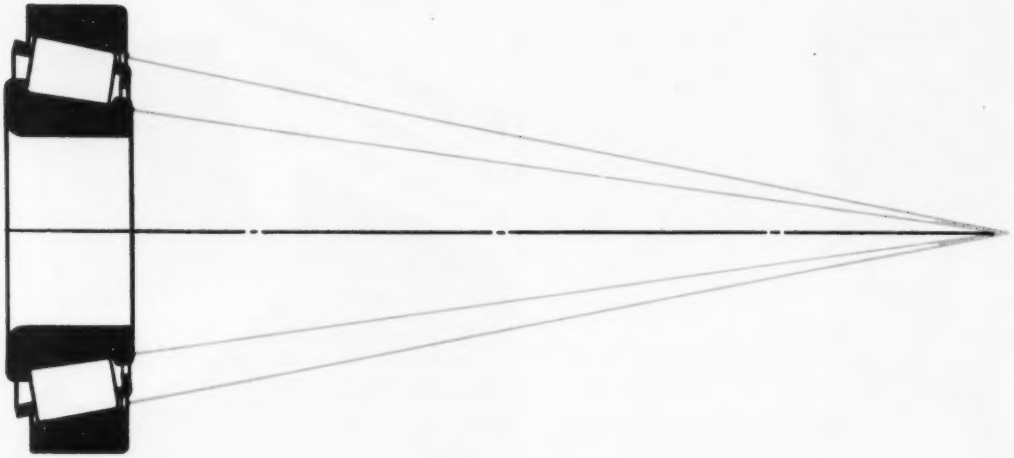
Talking Plastics

A CANDY box which recites its own message of greeting and a Humpty Dumpty who tells his own story are both being produced of plastics.

The candy box is drawn of clear Lumarith cellulose acetate sheet by Plastic Service Co., Los Angeles, Calif. When a "record" on top of the box is turned by hand, the words "Hello Sweetheart" are reproduced. The record is made from acetate sheet; the desired sound is produced when a brass eyelet "needle" rubs against it. Both box and record are made by Plastic Service.

The Humpty Dumpty toy has a two-part housing molded of Lustrex styrene. When a small handle is cranked, the toy recites the full verse about the "great fall." Verse is recorded on a tiny record pressed from cellulose acetate sheet stock. The toy is made by Alladin Plastics, Inc., Los Angeles, Calif.

Pressed acetate record recites nursery rhyme when crank is turned



Here's an old angle to help solve your newest design problem

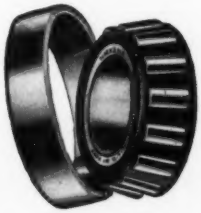
THE principle of true rolling motion illustrated in the diagram above is one of the outstanding reasons for the 50-year success of the Timken® tapered roller bearing.

The rolls and races of a Timken bearing are precisely tapered so that all lines coincident with their tapered surfaces always meet at a common point on the axis of the bearing. As a result, all rollers really roll. This true rolling motion means friction-free operation and minimum wear—helps hold precision longer.

Because of their tapered construction, Timken bearings carry both radial and thrust loads in any combination. Auxiliary thrust bearings or thrust plates are not needed. Tapered design also permits easy adjustment. Shafts are held in accurate alignment—end-play eliminated.

Due to the line contact between the rolls and races, Timken bearings have extra load carrying capacity. Timken bearings permit the use of effective closures that keep lubricant in—dirt out. Made of Timken fine alloy steel, they normally last the life of the machine.

If you have a machine design problem, Timken tapered roller bearings may help you solve it. Timken bearings add a valuable sales feature, too—build greater acceptance with customers. When you specify bearings, specify "Timken". When buying new equipment, look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST ←◎→ LOADS OR ANY COMBINATION ✳

Proof that METASAP STEARATES MEAN BETTER MOLDING

Here's proof, in 3 pictures, that Metasap Stearates can help you do an excellent molding job:

Picture 1 shows a preform such as no molder wants. It was obtained during extensive tests run by the Watertown Manufacturing Company, and proved typical of a large number of preforms molded from compounds that did NOT contain Metasap Stearate as lubricant. Such preforms required an average pressure of 50 lbs. to eject them from the mold, and an unprofitably large percentage were delaminated in the ejection process.

Picture 2 shows a typical preform obtained, during the same tests, from molding compounds containing Metasap Calcium Stearate. Perfect in shape, such preforms required only 10 lbs. of pressure to release them from the mold.

Picture 3 shows how early in the manufacturing cycle the advantages of Metasap Stearates can be realized. In rolling sheets of molding compound (prior to grinding for powder) the inclusion of a Metasap Stearate aids in preventing the material sticking to the rolling mill.

Photos courtesy of Watertown Manufacturing Co., Watertown, Conn.

ADD IT ALL UP—and the answer is plain:

Lubricating with Metasap Stearates assures—

Improved Preforms—without delamination . . . since high ejection pressures are unnecessary.

Improved Finished Products—clean cut, with more marketable finish.

Increased Output—Rapid, easy ejection avoids waste of time and effort—assures fewer rejects.

Increased Economy—Preform molding can be done with machines of less tonnage. Molding materials are conserved. Mold life is increased—because scoring is virtually eliminated.

Metasap Zinc and Calcium Stearates, for use in molding plastics, assure significant manufacturing economies all along the line—and better products, too. Today, when you must produce *quality* and sell *competitively* you'll find Metasap stearate lubrication an indispensable aid to more profitable operation.

For complete information, write

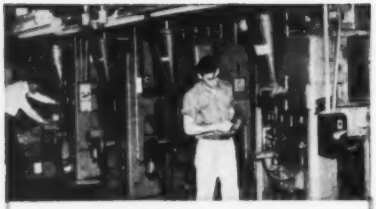
METASAP CHEMICAL COMPANY, HARRISON, N. J.

Chicago • Boston • Richmond, Calif. • Cedartown, Ga.

METASAP CHEMICAL COMPANY REG. U.S. PAT. OFF.

Stearates

of Calcium • Aluminum • Lead • Magnesium • Zinc

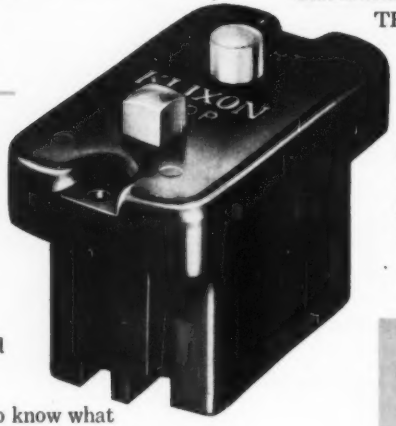


KLIXON

housing designed for automatic molding

The various plastic components which make up the complete housing for the new KLIXON C9150 manual-motor-starting switch were *designed* to be made by automatic molding . . . to assure uniformity of parts, material savings, and controlled inventories.

The battery of Stokes fully automatic 200D3 molding presses at the SPENCER THERMOSTAT Division of Metals & Controls Corp., at Attleboro, Mass., produce identically accurate parts . . . quickly . . . and at remarkably low costs. Filling hoppers and removing finished parts are the only labor requirements once the presses are set up for automatic operation.



Stokes fully automatic molding presses . . . there are many different models . . . are high-speed, flexible, foolproof, economical production units designed to produce a wide variety of simple or complex parts . . . by the hundred or by the million.

If you want to know what fully automatic molding can do for you, send samples or blueprints of your parts for a free analysis . . . there is no oligation, of course.

STOKES MAKES Automatic and Semi-Automatic Molding Presses, Plunger Presses, Closure Presses, Preforming Presses, Industrial Tabletting and Powder Metal Presses, Vacuum and Special Processing Equipment, Water Stills and Special Machinery.

F. J. STOKES MACHINE COMPANY

5934 TABOR ROAD

PHILADELPHIA 20, PA.

F. J. Stokes Machine Co.
5934 Tabor Road
Philadelphia 20, Pa.

☐ *Our parts or blueprints are attached for your free analysis.*

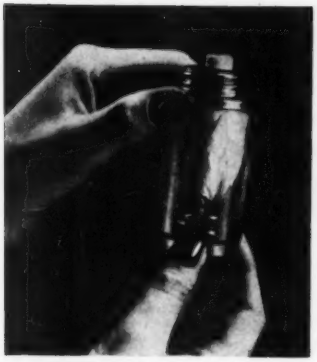
☐ *Send your bulletins on Stokes fully automatic molding presses.*

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____ DU



Demonstration model of twist dispenser. Polyethylene bag ejects contents when base is turned

Twist Dispenser

ALREADY well established as a competitor with glass in the bottle and jar market, polyethylene is now making its bid in the collapsible metal-tube field. Utilizing an inner bag of polyethylene to effect a unique method of dispensing cream and paste formulations, a new twist container, called "Twistube," is being manufactured by General Cap & Container Corp., New York, N. Y.

A bag of Bakelite polyethylene, inside a metal-ended cardboard cylinder 1½-in. in diameter, holds the cream. The open mouth of the bag is secured to the top circumference of the cylinder, while the closed bottom is fastened with a simple spring to a metal collar at the base. When the base is turned, the resulting torque applied to the bottom of the tube forces the contents out the uncapped top in amounts which can be easily controlled.

Polyethylene was selected for this application because of its flexibility and ability to withstand the twisting to which it is subjected during use. The material does not deteriorate over long periods of time, is odorless, and its chemical inertness to most alkalies and acids prevents contamination of the contents.

Developed by Lippincott & Margulies, industrial designer of New York, the plastic dispensing unit is claimed to eject 99% of the contents, in comparison with only 85 to 95% ejection possible with metallic collapsible tubes.


HOLD IT!
Contract
Before
YOU SIGN
THAT CONTRACT!
No matter what you're about to make or let out for production . . . as long as you haven't ALREADY irrevocably committed yourself . . . CHECK WITH PYRO!
Benefit by the Pyro services, among which CONSULTATION is our "big deal." We absolutely will NOT permit your product to be designed poorly or non-functionally; to use a plastic if another material serves better; to use the WRONG plastic.
Very consciously, very confidently . . . "we invite the challenge of your problems!" You canNOT lose if you pause before the dotted line . . .
. . . and write, call, wire or cable Pyro!
CONSULTATION
a) TECHNICAL
b) MERCHANDISING
c) PACKAGING
d) PREMIUMS
PRODUCT CREATION and DESIGN
ENGINEERING and DEVELOPMENT
MOLDING
ASSEMBLY
PACKING
SHIPPING
Pyro
PLASTICS CORPORATION
UNION, NEW JERSEY

Vinyl Insulation

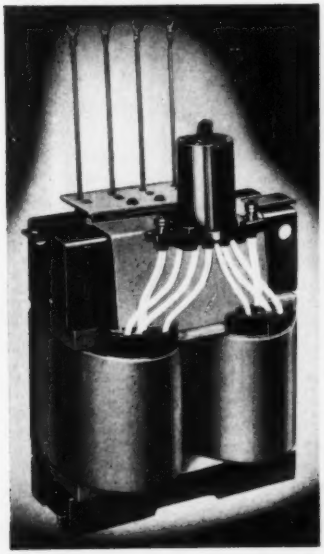
EXTRUDED vinyl tubing has solved an insulating problem confronting electrical transformer manufacturers. Prior to the development of a new Vinylite resin compound, conventional electrical insulating materials used in oil-immersed-type power equipment failed to stand up under long exposure to hot oil.

The new insulating tubing has been introduced by Dielectric Materials Co., Chicago, Ill. Severe tests indicate that it has high dielectric strength and outstanding flexibility at low cost.

To determine the heat-resisting characteristics of this application, leads covered with the special tubing were immersed in transformer oil for 60 days with the temperature maintained at 230° F. Upon completion of the test, no evidence of cracking, stiffening, or shrinking was observed in the extruded plastic. In fact, results indicated that it is unlikely to shatter as the result of transformer vibration. Further confirmation of the plastic's heat resistance was found in photomicrographs. Voids found in other materials did not exist in vinyl insulation.

High dielectric, heat-resistant vinyl insulates transformer leads

COURTESY BAKELITE DIVISION

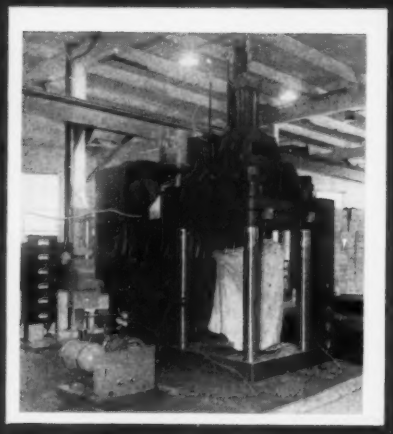


JACKSON & CHURCH

MODERN PLASTICS CORP. REPORTS

★ PRE-PLASTICIZES OVER 360 LBS. STYRENE PER HOUR

★ 500 SQ. INCHES PROJECTED AREA



The Jackson & Church 48 oz. Press, showing compact location of operator's controls.

View of Press showing grouped control arrangement of electrical controls, readily accessible.

AVAILABLE NOW!

NEW ITEMS, BIG ITEMS . . . .

from the Jackson & Church Company's Press with a capacity of 500 square inches projected area.

The Jackson & Church Company's Press is the all new machine that mass produces extra large, high quality injection molds at record speeds and at unmatched low cost. Because it operates at unheard of lower pressures than other machines, the press is light in weight, low in price and amazingly compact.

On a Jackson & Church Company's Press, the mold is the limiting feature. When the mold says . . . "Take the piece out" . . . the next shot is ready to go.

These are startling facts . . . possible on the 48 ounce Press — 360 lbs. styrene per hour . . . 500 square inches projected area. (Capacities of 64 and 80 oz. Presses available upon request).

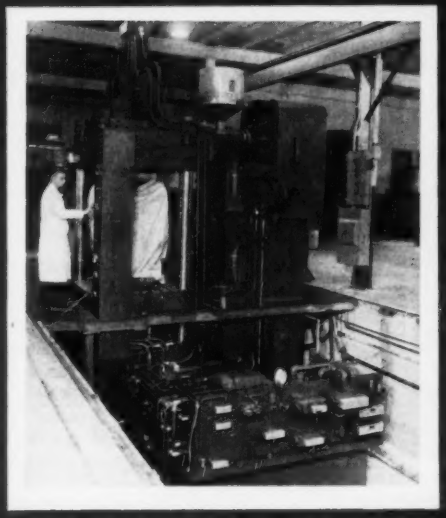
PRE-PLASTICIZING PROCESS
JACKSON & CHURCH CO
J C
Saginaw Michigan

JACKSON & CHURCH CO.

SAGINAW, MICHIGAN

WORK . . . WELL DONE SINCE '51

CUSTOMER REPORTS:
ON SUCCESSFUL OPERATION OF 48 OZ. PRE-PLASTICIZING PRESS



Press operates in a minimum of available floor space.

STYRENE COLORED AND INJECTION MOLDED IN ONE OPERATION

Here is welcome news: Injection molders can now save up to 5c per pound and cut down inventories by coloring styrene on our press. No need to pre-color, pelletize or in any way treat pre-molded styrene. Simply buy all crystal styrene, augment with small quantities of required dye, dry mix crystal with dye, run through J-C Press and get total diffusion of color in molded parts.

"No Trouble With Contamination"

"The plasticizing capacity was sufficient that we were able to mold 40 oz. castings in impact polystyrene at cycles much shorter than expected; the cycle time being determined by the cross-sectional area of the casting walls.

We also found extremely low molding pressure was required and that all castings were free of strains. The surface finish was very good for impact polystyrene and no trouble with contamination was encountered.

We are pleased with this new molding press and know that on this initial job we have not approached the maximum press capacity in plasticizing, casting area or production cycle. By the addition of this new equipment we have increased our capacity tremendously and are now definitely in the larger casting field."

(Statement of Modern Plastics Corp. on file at Jackson & Church Co.)

SPECIFICATIONS — 48 OZ. MODEL

Ounces Per Shot	48 Oz. (Styrene)	Speed of Closing	330 Inches Per Minute Slowed Down to 60 Inches Per Min. for Closing
Time Cycle for 48 Oz.	30 Seconds	Speed of Opening	425 Inches Per Minute Slow Down for Knock-Out
Total Poundage Per Hour	360 Lbs. (Styrene)	Maximum Overall Height	19' 8" to 21'
Pressure Per Square Inch on Material in Injection Chamber	10,000 p.s.i. Maximum	Maximum Daylight Opening	264 to 64"
Diameter of Plunger	3½" Diameter	Minimum Daylight Opening	9" to 32"
Diameter of Screw	3½" Diameter	Distance Between Tie Rods	93 to Right 56 Inches Front to Back 56 Inches
Speed of Screw	23 to 200 r.p.m.	Floor Space Required	95 Square Feet
Projected Area	500 Square Inches	Approximate Weight	68,000 Pounds
Locking Pressure	500 Tons 573 Actual		
Stroke of Clamp Cylinder	27" Min. 36" Maximum		

AVAILABLE IN 24, 48, 64, AND 80-OZ. MODELS

*Patents Applied For

Transparent Blender

FOR use in laboratories and pilot plants, a transparent unit has been announced by The Patterson-Kelley Co., Inc., E. Stroudsburg, Pa., manufacturer of Twin Shell blenders for mixing powders, granules, or other dry materials.

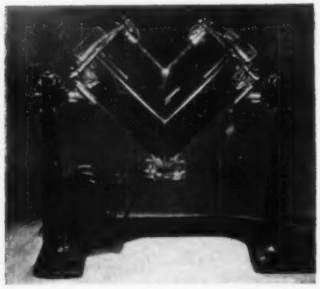
The laboratory units are V-shaped like the company's full size production units. This shape insures a thorough blending, because the materials are alternately thrown together and divided as the shell slowly revolves. Results as to efficiency of blending, timing, and capacities are comparable with results to be expected from production units. In addition, the transparency of the unit makes it possible to observe the mixing operation.

Two sizes of laboratory blender are available: 4-qt. and 8-qt. Either size can be mounted on an adjustable cast aluminum base on which a 1/20 h.p., 120-volt AC motor is mounted. The motor turns the shell at 32 r.p.m. by a chain and sprocket drive.

The transparent shells are fabricated of acrylic, with 3/16-in. Plexiglas used for the shells proper and ¼-in. material used for the cover plates. The 4-qt. shell is 6 in. in diameter and 16 in. long. It is made by joining two pieces of tubing. The 8-qt. shell, 8 in. in diameter and 20 in. long, is formed from two pieces of sheet stock.

Both types of shell have dust-tight charge and discharge connections with covers pivoted on one side for quick opening and closing.

Transparency of acrylic blender enables user to observe mixing



Can You Clean Your Dies and Kettles *CHEMICALLY?*

You can . . . if your dies are *Duranickel* and your kettles are *Lukens Nickel-Clad Steel.*

Lukewarm soda ash solution will clean a *Duranickel*® die or *Nickel-Clad* kettle in a few minutes!

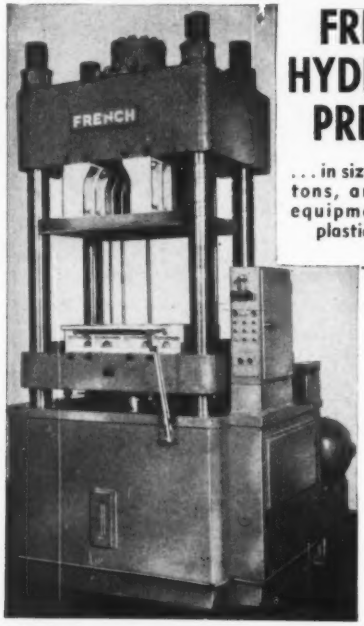
Savings in time and labor over hammer-and-chisel cleaning methods are tremendous, and there is no risk of damaging costly dies or equipment.

By specifying these modern "task metals", you insure other important advantages, too. *Duranickel's* high strength, hardness, and freedom from corrosion mean longer die life. And Lukens Nickel-Clad Steel has long been a *standard* metal for handling corrosives, maintaining product purity.

Write, today, for complete engineering information and sources of supply.

EMBLEM OF SERVICE
INCO
TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N.Y.

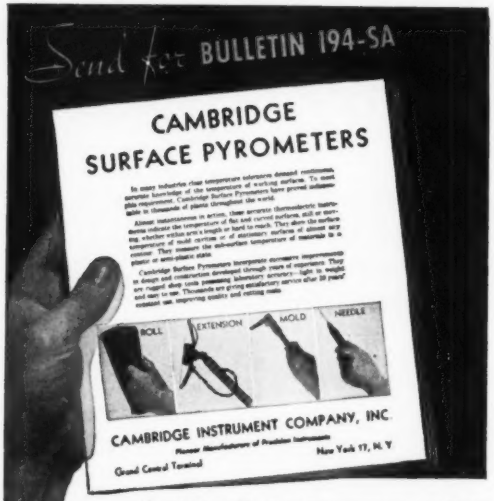


FRENCH HYDRAULIC PRESSES

. . . in sizes up to 1,500 tons, are standard equipment in the plastic industry.

Write for our catalog

THE FRENCH OIL MILL MACHINERY CO.
(HYDRAULIC PRESS DIVISION)
PIQUA, OHIO U.S.A.



Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged—for measuring temperature of mold cavities and flat surfaces, still or moving rolls, and within-the-mass temperature of materials in a plastic or semi-plastic state. Write for Bulletin 194-SA; 33 illustrations, many plastics applications.

CAMBRIDGE INSTRUMENT CO., INC.
3711 Grand Central Terminal, New York 17

THEY HELP SAVE MONEY AND MAKE BETTER PLASTICS

For low cost and versatility... compare this important new machine

RC-65 EXTRUDER

WHICH FUNCTION INTERESTS YOU?

- compounding
- coloring
- plasticizing
- scrap reclaiming
- extruding (from .010" monofilaments to 10" tubes, strips, special sections)

The RC-65 excels in every one of these jobs!

The RC-65 is a superior extruder in every respect . . . in production capacity, in construction, in economy of operation, in low initial cost, and in all-around versatility.

Ingenious features of the RC-65 which speed and increase output include interpenetrating twin screws for faster, more thorough mixing, controlling pyrometers and energy regulators for precision heat control, special non-corrosive alloy barrel and die head, and sensitive feed adjustment and indicator.

Be sure to compare the features, the output and the cost of the RC-65 *before* you buy an extruder. Send for descriptive literature on this outstanding new machine without delay!

SPECIFICATIONS

Average Output	66 lb/hr.*
Number of Screws	2
Diameter of Screws	3.15"—3.54"
Motor	
horsepower	5
speeds	3-speeds (6, 9, 12 rpm)
Shipping Weight (approx.)	2185 lb.
Floor Space	
extruder	2'6" x 3'6"
control panel	2'3" x 2'3"
Hopper Feed	Fully automatic, rotating type . . . geared to screw speeds
Lubrication	Forced-fed to all gears and bearings
Foundations	None required

IMPORTANT NOTE: Higher output models are available—the twin screw RC-100 with an average production of 100 pounds per hour, and the triple screw RC-200 with an average production of 200 pounds per hour. Send for particulars.

Sole U. S. A. Distributor

JACKSON & CHURCH COMPANY

Saginaw, Michigan

R. H. Windsor Ltd.

MANUFACTURERS UNDER L.M.P. PATENTS

16 FINSBURY SQUARE LONDON E.C.2 ENGLAND

Plastics in a Wheel Chair

Light-weight wheel chair folds easily, can be carried in automobile

ADVANTAGES of cellulose acetate butyrate and vinyl plastics contribute largely to added comfort, attractiveness, and handling ease which are major features of a new wheel chair known as the Liteweight. Manufactured by Versal, Inc., South Bend, Ind., and distributed exclusively by Sears, Roebuck and Co., Chicago, the new folding chair is said to be 25% lighter in weight as the result of combining aluminum and plastics in the chair's construction.

Because a wheel chair serves people who are physically handicapped in one way or another, it is important that such aids offer the patient complete comfort. By using Tenite II butyrate covering on side arm rests made of aluminum tubing, Versal has provided a material which is pleasant to the touch as well as attractive in appearance. A particularly striking lustrous effect is achieved by the transparent coating which permits the sheen of the metal to show through.

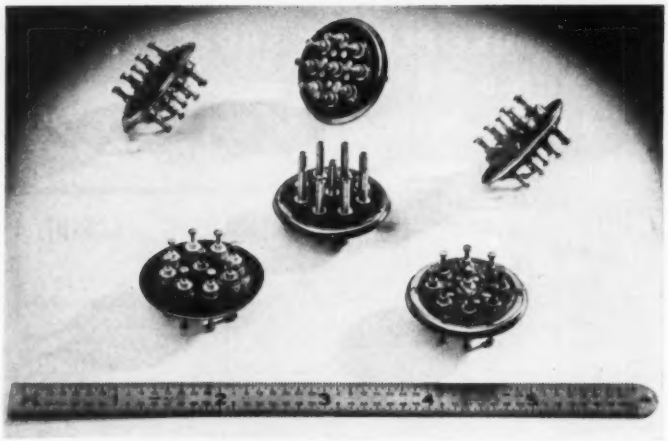
To match the arm rests, the hand rims on each wheel have also been coated with cellulose acetate butyrate. Thus they are warm to the touch when the hands are used to propel the chair.

Further comfort and styling is to be found in the chair seat and back. The material used here is 23-oz. Naugahyde, a vinyl-coated sateen produced by U. S. Rubber Co. This easily cleaned plastic is provided in colors which blend with the coated arm rests and hand rims. Combinations offered are green tubing with brown upholstery, and light-gray plastic coatings with gray upholstery.

Another important requirement for such equipment is maneuverability. Versal's wheel chair weighs only 32 lb., and is thus easily moved or lifted for cleaning. The chair can be folded into a compact $10\frac{1}{2}$-in. width when it is desired to carry it in an automobile or to store it when not in use.

Many additional features of the sturdily built chair insure greater comfort and efficient operation. The two-piece ribbed foot rests are adjustable for height, and can be folded up to permit easy entry. Roller bearings on the large 24-in. wheels are prelubricated. To protect clothing from damage, the aluminum side aprons have been finished in enamel which is colored to match the Tenite-II coated tubing. And, finally, the user's hands are protected from pinching by the seat's one-piece construction.

Arms and wheel rims are butyrate-covered; seat and back are vinyl



Multi-contact transfer-molded terminals have trifluorochloroethylene insulation which possesses high resistance to electric current and corrosive action

Fluorocarbon Moldings

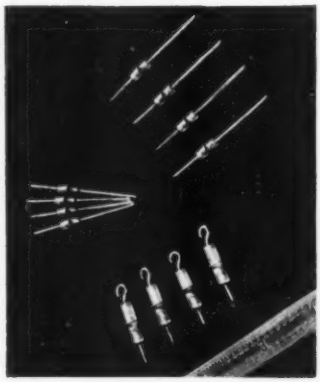
BECAUSE of its unusual properties, Kel-F, a relative newcomer in the plastics field, has found a number of special applications. For example, certain hermetically sealed terminals used by the Signal Corps called for a moldable insulating material which would resist high operating temperatures, low ambient temperatures, salt water immersion, corrosive atmospheres, and other difficult conditions to which it may be subjected.

The only material which combined all these qualities and thereby made it possible to produce the terminals proved to be Kel-F. This material, a high polymer of trifluorochloroethylene, has good electrical insulation properties, is virtually invulnerable to any corrosive action, and can stand temperatures as high as 390° F.

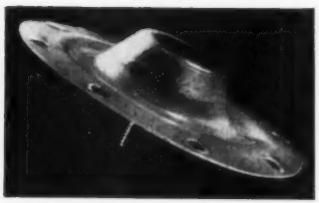
Molding Corp. of America, Providence, R. I., developed and produced the Kel-F sealed terminals. The first such terminals were single-contact terminals. Multi-contact transfer molded terminals, with the metal parts molded-in, have since been developed.

Another recent Kel-F application is a compression-molded diaphragm for special pumps. The one shown, which measures about 2½ in. in diameter, is compression molded by Modern Plastics Engineering, East Providence, R. I.

Individual hermetically sealed terminals are fluorocarbon insulated



Diaphragm for special pumps is molded of trifluorochloroethylene



• MANUFACTURERS' LITERATURE •

To obtain any of the booklets or catalogs listed below, simply circle the corresponding number on the post card, fill in the information requested, and mail.

CUT-OFF ATTACHMENT
Provided are specifications, illustrations, and a discussion of the features of the B & D automatic cut-off attachment for extruding-machine conveyors. Barker & Davis Machine Co., Inc. (7-600)

LAMINATED PLASTICS
Price list for comprehensive and individual tests frequently performed on laminated, thermosetting decorative sheets. 4 pages. U. S. Testing Co., Inc. (7-601)

HEAVY DUTY MILL
The Thropp 22" x 60" heavy duty mill featuring the new hydraulic safety brake, is illustrated and described. Standard specifications are included. 4 pages. Wm. R. Thropp & Sons Co. (7-602)

CONTROL VALVES
Bulletin on Electraulic control valves used in a direct hydraulic system. Illustrated. 4 pages. MacMillin Engineering Corp. (7-603)

CELLULOSE ACETATE MOLDING POWDER
Ampacet—a thermoplastic cellulose acetate molding powder for injection and extrusion molding, available in crystal-clear transparent and all colors—is discussed. 4 pages. American Molding Powder & Chemical Corp. (7-604)

PLASTICS
Such materials as Perspex, Alkathene, Welvic, Corvic, Mouldrite, Transpex, Kallodent, and Diakon, which are synthetic plastics manufactured by ICI, are presented. 56-page illustrated brochure. Imperial Chemical Industries, Ltd. (7-605)

CUSTOM MOLDING
Illustrated 4-page brochure describing the custom-molding service from engineering to power plant as offered by Harry Davies Molding Co. (7-606)

GLUE VS. NAILS IN PREFABRICATION
Data sheets discussing the use of synthetic resin adhesives in the construction of prefabricated houses. Rohm & Haas Co. (7-607)

GITS PLASTICS
Various Gits plastics products, including its unbreakable plastic flashlight are presented. Tests proving the durability of the flashlight are illustrated. Gits Molding Corp. (7-608)

KYS-ITE
Bulletin providing the features of Kys-Ite, the plastic reported to give strength plus beauty, light-weight, versatility, cleanability, and adaptability. Keyes Fibre Co. (7-609)

PLASTICS DATA
Brochure giving a summary of the types of information covered by the "Modern Plastics Encyclopedia and Engineers Handbook" for 1950. 4 pages. Plastics Catalog Corp. (7-610)

PLASKON PLASTICS
Illustrated 18-page brochure containing articles on many Plaskon products, including Alkyd, which is a thermosetting molding material. Plaskon Div., Libbey-Owens-Ford Glass Co. (7-611)

MILLING MACHINE
Discussed is the Keller machine, a powerful milling machine employing a system of automatic electric control to give faithful reproductions of a master shape, pattern, or template. Specifications and illustrations included. Pratt & Whitney Div., Niles-Bement-Pond Co. (7-612)

MARBLETTE
Properties, machining characteristics, stock dimensions, etc. of Marblette cast-phenolic resins. Various Marblette liquid-phenolic resins are also discussed. 8 pages. The Marblette Corp. (7-613)

TOOL STEEL SELECTOR
Circular chart which quickly answers the questions of exactly what type of tool steel should be used for about 95% of the machine-tool operations found in jobbing and specialty machine shops. Instructions for use included. Crucible Steel Co. of America. (7-614)

ENGINEERING PROPERTIES OF MONEL
Handbook facts about Monel—physical constants, mechanical properties, data on resistance to acids, salts, alkalies, and organic substances commonly used, including condensed working instructions. The International Nickel Co., Inc. (7-615)

MILLS, REFINERS, CRACKERS, AND WASHERS
Various types of two-roll machines, arranged for individual, twin, or lineshaft drive, for use with plastics, rubber, asphalt tile, rubber tile, and other materials. Adamson United Co. (7-616)

HANDLING PLASTIC MOLDING POWDERS
Eight pages of helpful information on the loading, storage, and handling of plastic molding powders. Illustrated. Monsanto Chemical Co. (7-617)

ADHESIVE FOR BONDING SILICONE RUBBER
A technical report on properties, instructions for use, and ordering information for adhesive for bonding silicone rubber and other materials. General Electric Co. (7-618)

TENITE EXTRUSION
Choice of material, extrusion-machine considerations, drying of material, die design, auxiliary equipment, extrusion of sheeting, and other information pertaining to Tenite I cellulose acetate and Tenite II cellulose acetate butyrate. 12 pages. Tennessee Eastman Corp. (7-619)

FURFURAL
Tables and charts providing physical data on Furfural; 16 pages. Illustrated. The Quaker Oats Co. (7-620)

HOT-STAMPING PRESS
Features, specifications, and prices of various Kensol hot-stamping presses, both hand and air operated. 4 pages. Illustrated. Olsen Mark Corp. (7-621)

ROLLER MILLS AND MIXERS
Detailed information on Day roller mills and mixers. Illustrations, specifications, features, advantages, etc, are given. 20 pages. The J. H. Day Co. (7-622)

AUTOMATIC BALANCED CONTROL
Applications, features, operating descrip-

READERS SERVICE DEPARTMENT
MODERN PLASTICS

7-600 7-601 7-602 7-603 7-604 7-605 7-606 7-607 7-608 7-609 7-610 7-611
7-612 7-613 7-614 7-615 7-616 7-617 7-618 7-619 7-620 7-621 7-622 7-623
7-624 7-625 7-626 7-627 7-628 7-629 7-630 7-631 7-632 7-633 7-634 7-635
7-636 7-637 7-638 7-639 7-640 7-641 7-642 7-643 7-644 7-645 7-646 7-647

If you do not now subscribe to MODERN PLASTICS, but wish to receive the next 12 issues ($5 everywhere), just check here ☐

NAME ..... POSITION .....

COMPANY .....

STREET ..... CITY ..... STATE .....

(Not Valid After October 1, 1950)

• MANUFACTURERS' LITERATURE •

To obtain any of the booklets or catalogs listed below, simply circle the corresponding number on the post card, fill in the information requested, and mail.

tion, engineering information, and specifications of Speedylectric for automatic balanced control. Illustrated. Livingstone Engineering Co. (7-623)

BALL, SWING, AND REVOLVING JOINTS

Brochure illustrating various ball, swing, and revolving joints for use on any system handling air, gas, steam, gasoline, oil, water, or any fluid where a flexible connection is needed. Short descriptions included. Diamond Metal Products Co. (7-624)

CARE OF AC ROTATING EQUIPMENT

Preventative maintainence in the care of AC rotating equipment is treated as well as machine repair. 24 illustrated pages. Allis-Chalmers Mfg. Co. (7-625)

DRYCOL

Brochure describing Drycol, a blended colorant, used for accurate and economical on-the-spot coloring. Prices are included. Gering Products, Inc. (7-626)

GOLD STAMPING MACHINE

Features, specifications, illustrations of the P.I.E. "Speed Set" press for gold stamping. Machinery Div., Hambro Trading Co. of America, Inc. (7-627)

ELECTRIC POWER DRIVES

The improved Sterling slo-speed motors are illustrated and described. Chart giving gear design is included. 4 illustrated pages. Sterling Electric Motors. (7-628)

MACHINING NYLON PLASTIC

Covered are sawing, drilling, turning, threading and tapping, milling and routing, sanding, and finishing in the machining of nylon plastic. E. I. du Pont de Nemours & Co., Inc. (7-629)

GRANULATION PROCESS

Information on the granulation process for the preparation of granular fertilizer. The advantages of granular fertilizer are included. 4 pages, illustrated. Sturtevant Mill Co. (7-630)

PLASTIFLEX

Detailed information on Plastiflex flexible mold material. 4 pages cover the material itself, care of equipment, patterns, etc. Calresin Corp. (7-631)

CABINET-TYPE INSTRUMENT PANELS

Illustrations, specifications, prices, and descriptions of various Wheelco cabinet-type instrument panels. 4 pages. Wheelco Instruments Co. (7-632)

ILLUMINATED PLASTIC DECORATIONS

Illuminated plastic advertising signs and displays illustrated. Descriptions of appearance and operation are included. 4 pages. General Plastics Corp. (7-633)

PLASTIC PRINTING PRESSES

Production and laboratory presses for printing vinyl, polyethylene, and other plastic films, and data on steel rollers. Illustrated. 4 pages. Lembo Machine Works, Inc. (7-634)

BARREL FINISHING OF PLASTICS

Information given on choice of equipment, compounds and carriers, details of finishing steps, definning, ashing, smoothing, and polishing. 4 pages. Illustrated. Lupomatic Industries, Inc. (7-635)

MOLDING METHODS AND MATERIALS

How plastics are molded, importance of good design, properties of materials, definitions of physical properties. Parts available from stock molds are listed and illustrated. 62 pages. American Insulator Corp. (7-636)

VINYL INK

An explanation on why ghosting or mark-off occurs in vinyl printing with a discussion of how to prevent this trouble. Atlas Coatings Corp. (7-637)

CASE HARDENING MOLD STEEL

Type analysis and description of Mirromold, a new case-hardening steel, including information on hobbing and machining, strength, heat treatment, etc. The Carpenter Steel Co. (7-638)

REGULATING VALVES

Catalog giving complete information on pressure-reducing valves, lever-operated balanced valves, auxiliary-operated pressure-regulating valves, and strainers for steam, water, air, gas, or oil. Prices are also included. 52 pages. Atlas Valve Co. (7-639)

PRECISION MOLDED PLASTICS

Brochure illustrating and describing in 8 pages the work in compression molding, transfer molding, and injection molding as done by Consolidated Molded Products Corp. (7-640)

INJECTION MOLDING MACHINE

The Moldmaster injection molding machine featuring pre-plasticizing for precision molding of all thermoplastics—including nylon—and hydro-pressure mold clamping for longer, trouble-free production runs, is illustrated and described in this bulletin. 12 pages. Crown Machine & Tool Co. (7-641)

INDUSTRIAL OVENS

This 36-page booklet describes the performance which can be expected from seven different oven designs, which include ovens suitable for curing and drying plastic products. Ferro Enamel Corp. (7-642)

EMBEDMENT BY MOLDING

Reprint of an article published in the October issue of MODERN PASTICS giving information on embedding articles in clear acrylic by compression molding. 2 pages. Creative Plastics Corp. (7-643)

INDUSTRIAL OVENS

Gas fired units for shop, factory, or foundry, in multiple-deck and swing-door types. 4 pages. The G. S. Blodgett Co. (7-644)

STABILIZERS

Bulletin composed of 11 sheets presenting product data and performance data on four stabilizers. Ferro Chemical Corp. (7-645)

STAFLEX IXA, STAFLEX QMXA, AND STAFLEX OY

Collection of four data sheets giving complete information relative to the materials listed. Deecy Products Co. (7-646)

EXTRUDER

The Hartig No. 2 extruder is illustrated and described in this booklet, together with a brief account of its development. A specification sheet is also included. 6 pages. The Hartig Engine & Machine Co. (7-647)

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

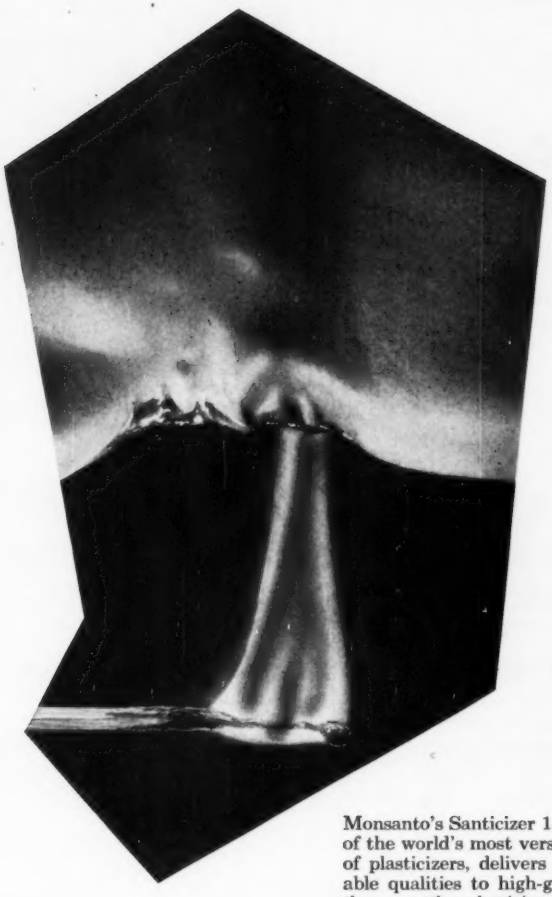
BUSINESS REPLY CARD

First Class Permit No. 2636 (Sec. 34.9, P. L. & R.), New York, N. Y.

MODERN PLASTICS

122 East 42nd Street

NEW YORK 17, N. Y.



SANTICIZER 141

...only plasticizer giving vinyls flame resistance plus nine other important qualities . . . . . .

Monsanto's Santicizer 141, member of the world's most versatile family of plasticizers, delivers *more* desirable qualities to high-grade vinyls *than any other plasticizer*. With these qualities, you can gain *more* customer acceptance for your product . . . *more* repeat sales . . . *more* profit.

Compare the properties of Santicizer 141 with those of any other plasticizer. See how much *more* you get with Santicizer 141. These are the advantages delivered by Santicizer 141:

1. Flame resistance. **2.** Low toxicity. **3.** Softness and drape. **4.** Resistance to weather. **5.** Low-temperature flexibility. **6.** Light stability. **7.** Low volatility. **8.** Resistance to embrittlement. **9.** Strength, elasticity, abrasion resistance. **10.** Improved processing.

If these qualities are important to your product, it will pay you to get full details on Santicizer 141. For literature, quotations and free sample, mail the coupon or contact the nearest Monsanto Sales Office.

MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1707-C South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

Santicizer: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1707-C South Second Street, St. Louis 4, Missouri

We are users of plasticizers. Please send, without cost or obligation, literature, quotations and sample of Santicizer 141.

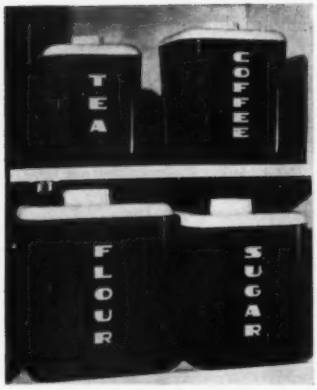
Name ..... *Title* .....

Company .....

Street .....

City ..... *Zone* ..... *State* .....

SERVING INDUSTRY . . . WHICH SERVES MANKIND



Styrene canisters for food products do not chip, peel, or absorb odors

Canister Set

A SET of food canisters and an ice bucket have been added to the Lustro-Ware line of styrene products produced by Columbus Plastic Products, Inc., Columbus, Ohio. The four canisters in the new set range from 5⅜ to 7½ in. high and from 4⅜ in. to 6¾ in. square.

The four-piece styrene set is molded with red and yellow bottoms, while the cover and lettering on the sides are white. Lettering is silk-screen printed, and a special enamel is used to provide maximum durability. The covers are crowned to provide an additional half inch of space for scoops or other measuring devices. The containers are said to be non-odor absorbent; they will not rust, peel, or chip.

Columbus' ice bucket is made with double styrene walls. The resulting sealed-in chamber provides air-space insulation. This not only keeps contents cool for extended periods, but also prevents moisture stains on furniture since condensation does not develop on sides or bottom. The bucket is available in several color combinations.

Ice bucket has double walls of styrene forming sealed-in insulating chamber

Phenolic-Sand Molds

(*Continued from pp.* 79-86)

age rule" must be developed since different sections of the cast pattern may shrink by different amounts.

Monsanto states that some work has been done with patterns which are self-heated by means of electrical heating elements buried directly in the pattern body. The temperatures of such patterns are thermostatically controlled. All patterns must be lubricated; according to Monsanto, silicone grease DC-7 dissolved in methyl ethyl ketone to a solids content of approximately 14% has been satisfactory. This lubricant may be wiped or sprayed on the pattern when either hot or cold.

Work has been done on two types of sand-resin mixes; one makes use of a dry resin and the second a combination of liquid and dry resin. The all-dry resin appears to have the advantage of longer life of mix stability, while the dry-liquid mix appears to do a satisfactory job with a lower resin content. At the present, it appears that no more than 2 hr. should elapse between the time of preparing the dry-liquid mix and the time of use.

The mixing operation when dry resin is used does not appear to offer any difficulties. Standard mixing equipment will do a satisfactory job in from 3 to 5 minutes. In the case of the dry-liquid mix, however, it is recommended that a vaned tumble mixer be used and that the liquid component of the combination be mixed with the sand for from 3 to 5 min.; the dry resin is then added and the tumbling continued for an additional 5 to 6 minutes. In the case of the dry-liquid mix, a total resin content of 6% is recommended, 10% maximum of which should be liquid resin and 90% dry.

If the metal pattern is self-heated by electrical means, the thermostat should be set between 400 to 500° F. according to the type of resin used. If an oven is used it should be heated to approximately the same temperature, but the oven should be so located that a minimum of time will elapse between removal of the pattern from the oven and the application of the resin-sand mixture. Most work has been done

Strategic Location...

ONE OF MANY REASONS WHY

GENERAL INDUSTRIES
Serves ALL Industry
with low-cost custom-molded plastics

If you use molded plastics . . . if you are planning to use them . . . consider carefully this basic economic fact about General Industries. Located at the hub of industrial America—within 24-hour shipping distance of each of the cities shown above—General Industries *guarantees* prompt, dependable delivery of your plastics parts, as promised.

Backing up this guarantee, of course, are the extensive facilities and engineering experience which have made General Industries one of the nation's foremost producers of top-quality molded plastics.

Now is the time to get the complete story about General Industries. Send *today* for your copy of our new 16-page booklet, *Your Product in Molded Plastics.*

Just off the press . . . new, 16-page booklet describing General Industries' complete facilities for injection, compression and transfer molding of top-quality plastic parts.

The GENERAL INDUSTRIES Co.

DEPARTMENT R • ELYRIA, OHIO

with the invertible mold box mentioned previously.

Continuous Flow of Mix

A different method of applying the resin-sand mix to the pattern appears to offer great possibilties. By this method, a continuous flow of resin-sand mix would be uniformly and continuously fed to the heated pattern until the required thickness had been built up. There are still mechanical problems to be solved for such a set-up, but it appears to offer great possibilities for a foundry producing many pieces.

Monsanto recommends that mold thicknesses be no less than ¼ in. and no greater than ⅜ inch. Company experience to date indicates that molds thinner than ¼ in. will not produce accurate castings. Such thicknesses will be built up on the hot pattern in from 6 to 15 seconds. If the metal patterns are self-heated, the molds may be cured without the use of an oven, simply by permitting the mold to remain on the hot pattern for a sufficient length of time to effect a complete cure. This method of cure, however, requires a longer time than oven curing because heat is applied to the mold from one side only.

Experimental work on mold cure has been done by Monsanto, in which the uncured mold is stripped from the pattern and placed in an oven. This method of operation would speed up mold production and reduce the number of patterns required for large scale production. However, the problem of warpage has been encountered, and until this difficulty is overcome, stripped-mold curing is not recommended. In any case, the time for oven cure is from 3 to 4 min. with an oven temperature of 600° F.

The methods for clamping the mold halves and pouring the metal are similar to the ones previously discussed, although Monsanto indicates that some other more satisfactory methods may soon be developed. The company does not believe that the sand used for the molds can be reclaimed without very expensive reclaiming equipment. And it also foresees that special resins must be developed to produce molds for different metals.—END

Fatigue

(*Continued from pp. 93-94*)

220° F. This condition was selected because it provides the most reproducible results.

Specimens for the fatigue tests were prepared as follows: Commercial size sheets (36 by 36 by 1/16 in.) were prepared in regular production equipment. The sheets were cut into 6- by 6-in. specimens; specimens selected at random were tested.

The fatigue tests were conducted by the following procedure: The specimens to be tested were dried in

Table III.—Effect of Conditioning Treatments on Dielectric Strength (Short Time) of Grade XX Laminate[a]

Conditioning treatment	*Dielectric strength (short time)*
	v./mil
1 hr. at 220° F.	690
96 hr., 90% R.H., 95° F.	240
48 hr. in H_2O at 122° F.	112

[a] Average for five specimens, 1/16 in. in thickness, tested at 73° F.

an oven at 220° F. for 1 hr. and then cooled in a desiccator to 73° F. The first three specimens of each grade were tested in oil by the short-time method in accordance with A.S.T.M. Of the remaining samples, the specimen to be tested was removed from the conditioning chamber, placed between electrodes of the testing equipment and immersed in the oil bath. Voltage was applied at the rate of 10 kv. per sec. until the desired voltage was attained. In general, an effort was made to test at 85, 70, 60, 55, 50, and 45% of the short-time value. This voltage was maintained until rupture occurred. Voltage applied and time for failure to occur were recorded.

The fatigue data are presented in Table IV and Figs. 2 through 6. The dielectric strength of each material showed a rapid decrease with time until the voltage was reduced to approximately 60% of the short-time value. At this point, the dielectric strength tends to approach a value below which failure does not

Table IV.—Short-Time Dielectric and Fatigue Strengths of Laminates at 73° F.

Grade, thickness (in.), condition[a]	*Short-time dielectric strength*	*Dielectric fatigue strength*
	v./mil	*v./mil*
Part A		
XX, 1/32, dry	940	515
XX, 1/16, dry	695	390
XX, 1/8, dry	515	290
Part B		
XX, 1/16, dry	695	390
XX, 1/16, C-96-90-95	240	150
XX, 1/16, D-48-122	112	55
Part C		
XXXP, 1/16, dry	780	500
XXXP, 1/16, C-96-90-95	700	400
XXXP, 1/16, D-48-122	680	375
Part D		
X, 1/16, dry	649	320
XX, 1/16, dry	695	390
XXXP, 1/16, dry	780	500
LE, 1/16, dry	434	320
A, 1/16, dry	155	130
G-5, 1/16, dry	450	310
NN, 1/16, dry	394	305

[a] Code for conditioning treatments: Dry = 1 hr. at 220° F.; C-96-90-95 = 96 hr. at 95% relative humidity and 95° F.; D-48-122 = 48 hr. in water at 122° F.

Smart BUYERS

SPECIFY

VARCUM RESINS

More and more, resin buyers are getting "crazy like a fox". Every time they need phenolics, they're specifying VARCUM.

That's because they have learned that VARCUM not only offers a broad enough line to cover the phenolic resin requirements of all industries, but in addition they get:

1. INDIVIDUAL and CONCENTRATED ATTENTION for their specific problems.
2. UNIFORMITY OF PRODUCTION that gives them the same outstanding results, time and time again.
3. A source of supply that is DEPENDABLE and cooperative.
4. And . . . delivery that is always PROMPT.

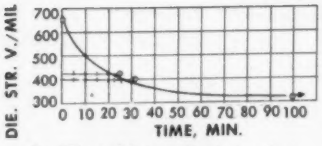
That's the way we have been building complete customer satisfaction down through the years. We'd like a chance to demonstrate these plus-values to you. Why not get "crazy like a fox" and call on VARCUM the next time you have a resin problem?

VARCUM CHEMICAL CORPORATION

NIAGARA FALLS, NEW YORK

occur for at least 100 minutes. A duration of 100 min. was considered to be an indefinite time period, because in five separate cases the samples which resisted breakdown for 100 min. continued to resist rupture for 6 to 8 hr. without failure.

Table IV gives a comparison between the standard short-time dielectric strengths and dielectric fatigue strengths. Parts A and B show that short-time dielectric strength and dielectric fatigue strength are affected by thickness of sample and by atmospheric conditions surrounding the specimen prior to test. This is shown graphically in Fig. 2 and 3. Parts B and C indicate that atmospheric conditions do not have the same degree of effect on dielectric breakdowns for different grades of laminates. Grade XXXP is affected less than grade XX; this is probably due to the fact that grade XXXP has greater water resistance than grade XX (see Fig. 3 and 4). In Part D is shown the short-time dielectric strength and dielectric fatigue strength of 7 commercial grades of laminates for a given thickness and



6—Effect of intermittent stressing on dielectric fatigue strength of 1/16-in. thick grade X laminate which has been tested dry at 73° F.

conditioning. (Data shown in Fig. 5).

For dry specimens the dielectric fatigue strengths of seven standard grades of laminates vary from 49 to 84% of the corresponding short-time dielectric strengths. Under these conditions a safety factor of three, based on the short-time test, should be ample. For the two grades exposed to 90% relative humidity at 95° F. the dielectric fatigue strengths vary from 57 to 62% of the corresponding short-time dielectric strengths. Here again a safety factor of three should be satisfactory. In actual practice, however, the designer may occasionally expect to use equipment under highly humid conditions, and the published data on the laminates may be limited to short-time dielectric strengths for dry conditions. In this case a safety factor of six, recommended by N.E.M.A.[5], may be necessary.

Figure 6 indicates that the gradual destruction of a laminate at excessive voltages is accumulative. A dielectric stress of 425 v./mil was applied for 5 minutes. This test was repeated once every 24 hr., thus relieving the sample between stresses. Breakdown occurred after five 5-min. periods of stress which is approximately the total time required to rupture the sample with continuous stress. The experiment was repeated at 400 v./mil with similar results.

Conclusion

In selecting the proper grade and thickness of a thermosetting plastic laminate to be used as a dielectric medium, it is important to know the dielectric fatigue strength of the available grades for the atmospheric conditions involved.

The experimental work described above was done at the Research Laboratory of Synthane Corp., Oaks, Pa.—END

[5] Paragraph LP2-64 of reference in footnote 4.

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Plastisol for Casting Film

LAST November, MODERN PLASTICS printed an article on vinyl spread coating in which it was broadly hinted that the day might not be far off when cast film made from vinyl plastisols would be common rather than occasional practice. Today there is growing evidence that this development is broadening in several ways. One experimenter states that the future for this process looks good not only in 2-mil film and under, but also reports that 20-gage sheet made from cast plastisol is right now in successful production on a small scale. The latter is especially significant since it indicates that plastisols are not limited to casting thin gage film, in contrast to other types of vinyl-casting compounds which are generally used only on light weight jobs.

Our informant tells us that although steel belts have generally been used for plastisol casting on the limited amount of work that has been done so far, he has found that the job can be done quite successfully on paper with a reverse-roll coater. Steel belts present problems of high initial cost and the difficulty of matching the steel belt to the coating head. Another advantage in the use of paper is that a printed sheet with transfer ink can be used so that the design will be transferred to the film from the belt. Thus a continuous operation of casting a finished printed film becomes possible. It is also believed that plastisols can be cast on a pre-embossed paper and the design transferred to the plastic.

One type of paper employed can be used twice on each side. Another type with melamine finish gives a higher gloss and can be used 12 times, according to our informant. Cost of paper used for this process is about 1¢ a sq. yd. of film produced when the paper is reused. An even better printed surface can be obtained, it is claimed, by using an aluminum foil-paper laminated belt which will bring out color tones of the finest detail and brilliance.

Developers of this plastisol casting method assert that cast and printed vinyl film can be run through processing machinery of this type as fast as 400 ft. a min. if sufficient heating and cooling equipment is provided. Cooling equipment is particularly important at such high rates of speed. Apparatus for handling the complete operation can be set up at a cost of from $35,000 to $50,000.

*Reg. U. S. Pat. Office.

Resin Bonded Insulation

THE newest addition to the Fiberglas insulation family is Aerocor, made of superfine fibers by the Owens-Corning Fiberglas Corp., Toledo 1, Ohio.

Individual fibers in various Aerocor types average from 0.00005 to 0.00012 in. in diameter. Lightly bonded with a thermosetting resin into blankets, they form a light, efficient barrier to heat and sound.

The product is available in a range of densities from 0.3 to 1.0 lb. per cubic foot to suit specific applications. Aerocor has been successfully used as thermal and sound insulation in boilers, home freezer units, air conditioners, incubators, and transportation equipment.

Metallic Polyethylene

POLYETHYLENE molding powder can now be obtained in metallic colors from Gering Products, Inc., Kenilworth, N. J.

The history of metallic colors in plastics products indicates the potential advantages of this newest material for use by polyethylene molders. Some two years ago metallic colors were introduced for use with vinyl film; then came the incorporation of metallics in styrene molding material. In both cases, the markets for products with a metal-like finish broadened rapidly.

The news that metallics are now available in polyethylene marks a significant step forward in the use of metallic colorants for plastics because color in polyethylene has heretofore been largely confined to pastels. The brilliant colors available in most other thermoplastics have not been obtainable in polyethylene; thus, the introduction of metallics should have a marked influence on the consumer market.

Gering is now offering this metallic-colored polyethylene molding material in eight different shades at prices of from 55¢ a lb. in 30,000-lb. lots to 66¢ in 200-lb. lots. If the customer prefers to buy his own natural-color polyethylene and have it shipped to Gering for metallic coloring, the price is from 10 to 21¢ a lb. in quantities varying from 30,000 to 200 pounds.

Unlike other colorants which may be purchased separately if the molder wishes to do his own coloring, metallic colorants are not furnished to molders for use in coloring their own material. The metallic powder used for coloring is said to be difficult to handle and requires special storage facilities not generally available in molding plants; but once it has been incorporated in the polyethylene, it is perfectly stable.

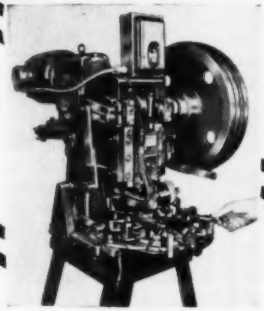
Long specialists in the art of plastics coloring, Gering claims to be first in the field to market metallic polyethylene, as well as tinsel and mother-of-pearl colors recently developed for application in the specialty field.

Easy-Processing Vinyl Resin

DEVELOPMENT of a new easy-processing vinyl resin for use in the manufacture of draperies, upholstery, table coverings, flooring, and electrical wire and cable insulation has been announced by Naugatuck Chemical Div., U. S. Rubber Co. Called Marvinol VR-20, the new resin is said to exhibit excellent gloss when extruded at temperatures 10 to 20° below those used when extruding most proprietary resins.

In the calendering field, the new resin will eliminate or greatly reduce the need for copolymer pro-

HOT STAMP



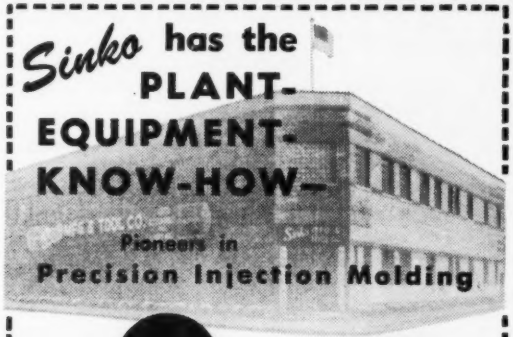
The Acromark No. 2A Hot Stamping Press can be set for marking speeds to suit either hand or mechanical feeds. The dial feed shown is hand loaded but automatically ejected. Hot stamping speed (in color) is about 58 units per minute. Automatic feed can double production if shape of plastic part lends itself to mechanical feeding.

Write to—
The Makers of a Full Line of Marking, Numbering and Hot Stamping Machines.

The ACROMARK Company

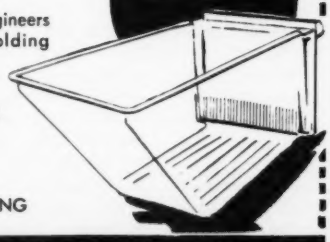
5-15 MORRELL ST., ELIZABETH 4, N. J.

Sinko has the PLANT-EQUIPMENT-KNOW-HOW—



Pioneers in Precision Injection Molding

from 4 oz. to 60 oz.



Consult our engineers on all your molding problems.

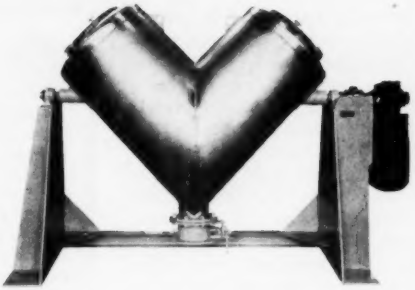
- ★ METAL-PLASTIC ASSEMBLIES
- ★ PLASTIC PAINTING
- ★ NYLON MOLDING

Sinko MANUFACTURING & TOOL CO.
3135 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

P-K Twin Shell Blender*

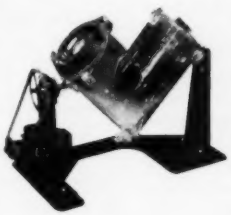
Fastest Unit for Color Blends *on the "Per Order" Basis*

You know the advantages of blending colors "as ordered" rather than piling up stocks awaiting orders. But to do this economically requires a fast and efficient blender... a blender such as the Patterson-Kelley Twin Shell Blender.



*Patents Pending

First, a word about the action of this blender. Note the V-shape design. This provides a unique blending action. As the unit rotates, the charge splits into two masses which combine again in a rolling and folding flow of particles. Then it splits and combines again and again. This action is so effective that perfect production blends are accomplished in only a few minutes ...in much less time than with the barrel or drum type of blender.



As to sizes of P-K Blenders, you can get units as small as 1 cubic foot capacity or as large as 300 cubic feet capacity. Thus, you can get this unique V-shape blender in a size close to your production requirements. Shells are available in stainless steel, if desired, or any other metal.

If you would like to have tests run on your color blends, we shall be glad to run them in our laboratory with your representatives present, if desired. Or if you would like to study the matter further, write for our Catalog 401.

the P Patterson-Kelley Co., Inc.

33 Burson Street **East Stroudsburg, Pa.**
New York Office: 101 Park Ave., New York 17, N. Y.

PLASTISCOPE

cessing-aid resins, according to the company. Its use is also said to permit lowering Banbury and calender temperatures 10 to 15° below previous practice.

Ion Exchange Bed

THE use of a special dyed mixture of Amberlite ion-exchange resins which changes color as the bed becomes exhausted is reported as a new concept in deionization developed by the Resinous Products Div., Rohm & Haas Co., Philadelphia, Pa. Called the Monobed technique, it provides complete deionization, yielding a product with a mineral content of less than one part per million from ordinary faucet water.

Addition of the new indicating feature affords a simple means of checking the exhaustion point of the bed. A dark blue color in its regenerated state, the Monobed becomes a yellowish brown when exhausted, enabling the user to watch the latter color travel down the bed as exhaustion advances and thus know when to replace the resins.

Princeton's Training Program

WHEN the war ended in 1945, returning veterans called for advanced study in plastics. To meet this unexpected demand, Princeton's Plastics Program, which was just beginning to materialize, was immediately incorporated in the Graduate Curriculum that fall and, a few months later, a sizeable plastics research project was initiated.

Sponsored by the School of Engineering and administered by a Plastics Committee under the chairmanship of Dr. Louis F. Rahm, the plastics program is guided by two outside advisory committees which help formulate and direct its educational and research activities. The Plastics Advisory Council, headed by G. K. Scribner of Boonton Molding Co., represents industrial management in the fields of research, materials, conversion, and equipment, and advises on the educational and technical needs of the plastics industry; the Services Technical Committee, under the leadership of A. W. Rogers, represents the Army, Navy, and Air Force, and advises on the government-sponsored research program. The curriculum is composed of five courses.

In the May 25th edition of a New York newspaper, Macy's announces polyethylene bottles at a retail price of 16¢ for a 2-oz. bottle and 19¢ for the 4-oz. size. A zippered vinyl kit containing three 2-oz. bottles with colorful plastic closures was offered at 94¢ plus federal tax of 10¢.

MODERN PLASTICS congratulates Macy's and the makers of the bottles and kits offered by them on establishing a policy of realistic pricing for mass markets. Having attacked the subject with some editorial vigor in our February 1950 issue—in which we pointed out that empty 4-oz. polyethylene bottles at 59¢ and three such bottles in a vinyl kit at $3.50 retail was fantastic pricing and likely to have an adverse effect on larger markets ahead—MODERN PLASTICS modestly takes some credit for the obviously worthwhile trend toward realistic pricing of squeeze bottles as evidenced in Macy's offering.

Sealing Polyethylene Film

CONTINUOUS sealing of polyethylene film has been made possible by a new method introduced by the Technical Service Section, Cellophane Div., E. I. du Pont de Nemours & Co., Inc. The development makes use of specially prepared finishes containing fine particles of Teflon tetrafluoroethylene resin which, after fusing at 750° F., will provide metal surfaces with a non-stick coating.

The rotary sealing wheel of the machine is aluminum; it is provided with suitable heating elements and thermostat control. The Teflon-coated sealing surface of the wheel is about ⅛ in. wide. The wheel is mounted in the conventional position on a standard heat-sealing machine and counterbalanced with an adjustable weight. Cotton tape and sheet Teflon cover the forming plate at the point of contact with the sealing wheel.

According to the company, it is possible to seal polyethylene at speeds up to 100 ft. per min. with this process and equipment.

Boilable Vinyl Film

INTRODUCTION to the market of a new 4-gage calendered vinyl film, to sell at the standard price of other vinyl films, has been announced by The Goodyear Tire & Rubber Co. The new film, intended primarily for baby pants, is soft; will stand prolonged washing in hot soapy water; has gone through boiling tests of 60 hr. in clear water and 12 hr. in soapy water with a 1% detergent solution.

The new film can be printed and high-frequency sealed; according to the producer, it has a lower tendency to mar than other vinyl films. It will be available at a later date in a series of colors, but is available now only in colorless translucent. The same material will be useful for dress shields, crib sheets, or any other type of application where the product needs to be placed in a washing machine.

Transparent Aircraft Enclosures

WHEN high-speed pressurized aircraft replaced unpressurized military craft toward the end of the war, the monolithic acrylic sheeting employed in the transparent enclosures in the earlier models was found inadequate, according to a brochure recently issued by Swedlow Plastics Co., Los Angeles, Calif. Failures of enclosures due to higher loadings and the rapid decompression of airplanes in the event of enclosure failure became a serious hazard. The use of laminated acrylic sheeting in the same application retained many of the same limitations, according to the Swedlow report, which goes on to state that acrylic resin-bonded Fiberglas laminates for attachments or reinforcements for the acrylic enclosures are dangerous due to stresses thrown on the acrylic.

To discover solutions to these problems, Swedlow urges adoption

PLASTISCOPE

of a comprehensive development program by the Armed Services for development of new glazing materials and new methods for attachment and reinforcement media.

According to Emily Post

IT is strictly *comme il faut* to give plastics gifts for the first wedding anniversary. Who says so? No less an authority than Emily Post, in the 1950 revised edition of her book, "Etiquette."

"Because the first wedding anniversary is of very great importance and paper so very limited in gift value," Mrs. Post explains, "the trend toward making plastics the accepted first year gift is too appealing to disallow."

Monsanto Chemical Co. is planning to make Mrs. Post's recommendation the keystone of a promotion which will include a four-color ad in the *Saturday Evening Post* showing Emily Post with many plastics gift items. Monsanto will offer retail stores a kit of display material which will include reprints of the *Post* ad, banners, counter cards, and window trims.

Plastic Metal Casting Compound

MARKETED under the name Plasti-Metl is a new casting compound that is neither a metal nor a plastic, yet partakes of the qualities of both. Developed by the Plastics Div. of The Lockrey Co., College Point 3, N. Y., the new material is a mixture of very finely flaked copper and phenolic liquid resin which is harder when cured than some casting metals, but can be cast at room temperature. When mixed with varying amounts of a liquid acid catalyst, it will polymerize and set at room temperature without heat, or in an oven at low temperatures, forming a hard, tough, metallic-appearing casting that can be machined or polished with ordinary tools, according to the firm.

A thermosetting material which cannot be softened by heat, Plasti-Metl is said to be completely resistant to all common chemicals except strong alkalies, and has a shrinkage of about 0.004 to 0.006 in. per inch. It can be poured into rubber, elastomer, plaster, metal, or clay molds, with or without inserts, or can be slush-molded. It is recommended as a casting for forming molds, novelties, short runs of molded parts, and machine-replacement parts.

Anti-Static Agents

TWO new anti-static agents designed specifically for use on styrene products have been announced recently. Featuring resistance to frequent wiping without losing its effectiveness is D-Stat-B, developed by Roxbury Chemical Works, Inc., Centredale 11, R. I. By eliminating unsightly dust collection due to static attraction, the colorless, odorless, inexpensive D-Stat-B is said to enhance the brilliance of the styrene product. The agent can be readily applied by dipping, brushing, or spraying.

Prevention of dirt and dust accumulation, thereby reducing scratches on styrene products, is also the objective of Anstac-PS, an anti-static agent produced by Chemical Development Corp., Danvers, Mass. Anstac-PS has a high affinity for styrene, and is said to last indefinitely under normal handling. The low-cost, fast-drying product can be applied by a quick dip or by swabbing with a cloth.

S. P. I. Elections

REELECTED president of The Society of The Plastics Industry at the organization's recent annual business meeting was Horace Gooch, Jr., a founder and currently treasurer of Worcester Moulded Plastics Co., Worcester, Mass. A veteran in the industry, Mr. Gooch observed: "At the rate the plastics industry has been going the first four months of this year, there are indications of a 10% increase in production of plastics raw materials for 1950. . . On an over-all industry-wide basis, production of these materials, it is now estimated, will approximate 1,650 million lb. for the year."

Other officers elected are: chairman of the board, George H. Clark, vice-president, The Formica Co., Cincinnati, Ohio; vice-president, Spencer E. Palmer, assistant vice-president, Tennessee Eastman Corp., Kingsport, Tenn.; and secretary-treasurer, J. E. Gould, vice-president, Detroit Macoid Corp., Detroit.

Tableware Cleanser

STAINS and discolorations on plastic tableware can now be removed by a new compound in a simple dip process, according to Maid-Easy Cleansing Products Corp., Mt. Vernon, N. Y., manufacturer of the stain remover. Called M-E Plastic Cleaner, this oxi-generating compound is odorless and tasteless, and contains no chlorine with its attendant odor and possible etching effect. Prolonged immersion is said to leave no after-effects.

Also being offered by this company are daily dishwashing compounds incorporating the same oxi-generating properties which clean and are reported to give additional luster to plastic ware.

Vinyl Film Operation

WITH the announcement by W. O'Neil, chairman of the board and president of The General Tire and Rubber Co., that production of vinyl film has commenced at the firm's Jeannette, Pa., plant, a major addition to the concern's operation was disclosed. Capacity production of vinyl film is expected shortly.

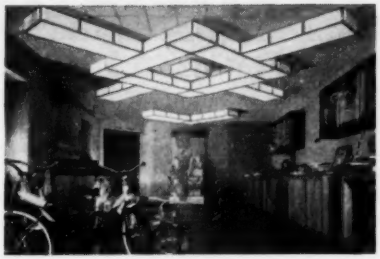
Sheet Molding

PRODUCTION of custom-molded sheet-plastic forms and packages having extra strength and unusual clarity are features of a new process developed by Tut, Inc., Auburn, N. Y. Called Tuformit, the method is adapted to special custom specifications where thin-wall boxes, dust covers, plastic displays, and specialized packaging units or component parts are required.

Among the advantages claimed for this process—in which plastic sheet stock is formed in fiber molds—are excellent clarity; strength and toughness produced by heat treatments; and smooth surface through

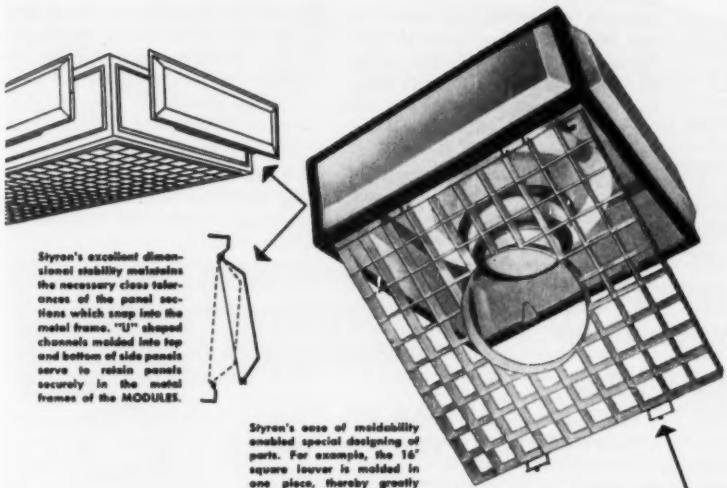
"designed right—in the right plastic"

HERE'S HOW A MOLDER'S KNOW-HOW plus STYRON *solved another production problem!*



ANOTHER MOLDING CASE HISTORY

Styron fulfilled an important need in the development of the Module lighting system by Mitchell Mfg. Co. This new lighting system required a lightweight material possessing good rigidity, translucency and dimensional stability. Styron met these requirements exceptionally well. Its ease of moldability also meant a faster production cycle that lowered fabrication costs.



Styron's excellent dimensional stability maintains the necessary close tolerances of the panel sections which snap into the metal frame. "U" shaped channels molded into top and bottom of side panels serve to retain panels securely in the metal frames of the MODULES.

Styron's ease of moldability enabled special designing of parts. For example, the 16' square louver is molded in one piece, thereby greatly reducing costly assembly operations of finished piece.

The light weight of Styron was utilized in molding the side panels and louvers of the MODULES. This lightweight feature permitted a much larger and more versatile lighting installation than would be possible with comparable heavier materials.

Available in special white colors, Styron gave necessary degree of light transmission and diffusion for fluorescent lighting fixtures.

The light weight of Styron allowed use of simple, inexpensive metal latches and hinges to hold louver to supporting frame. These ingenious fasteners hold louvers securely in place, yet permit easy removal for cleaning and tube replacement.

Module lighting unit manufactured and distributed by Mitchell Manufacturing Company, Chicago 14, Illinois. Side panels molded by U. S. Plastics Corporation, 2835-59 W. Irving Park Rd., Chicago 18, Ill. Louver molded by Gar-Ell Mfg. Co., 2446 So. Indiana Ave., Chicago, Ill.

Take your difficult fabrication problems in plastics to the Custom Molder and let him select the right plastic for your product from a wide range of Styron (Dow polystyrene) formulations. Valuable experience in designing plastics products is offered you by the Custom Molder. When applied to your particular problem, this experience means that you receive more and better plastics pieces for every dollar you spend.

Dow's competent and experienced technical staff works closely with Custom Molders to help them utilize Dow Plastics to the best advantage in your products. Write Dow today for technical bulletins that give extensive information on the properties and performance of various Dow Plastics. Let us put you in touch with qualified Custom Molders who can solve your production problem.

Plastics Division—Dept. SOT-36

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

DOW *plastics*

New York • Boston • Philadelphia • Washington • Atlanta • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle • Dow Chemical of Canada, Limited, Toronto, Canada

PLASTISCOPE

the use of a steam-table heating process that reduces strains and hence checks or line marks. The process is particularly adaptable for small runs because the initial cost of molds is very low. Sheet from 0.010 to 0.125 in. thick can be handled.

Lacquer for Vinyl

DEVELOPMENT of a new type of synthetic lacquer that permits designs to be screen printed on vinyl has been announced by The Monroe Sander Corp., Long Island City, N. Y. The product, which is said to eliminate the puckering often encountered in screen printing, is available in a variety of colors. The lacquer can be used on curtains, draperies, and tablecloths; vinyl inflatables; sheets and other baby items; and advertising displays.

Coatings

A LINE of ready-mixed vinyl coatings is being offered by James Lithgow Co., Inc., Los Angeles 22, Calif. The coatings, marketed under the trade name Calvinac, are air drying and non-toxic and can be applied to wood or metal by brush, spray, or dipping. They are claimed to be highly dielectric; to be resistant to alcohol, acids, salts, alkalies, and fumes; and to be particularly effective in protecting petroleum equipment.

Calvoseal, a coating created for concrete, masonry, and plaster, is said to dry with the evaporation of water and, once dry, is impervious to moisture. A selection of standard colors is offered.

Rubber Reenforcing Resin

IMPROVED production processing of shoe sole stocks is said to result from using a new rubber reenforcing resin developed by the Chemical Div., The Goodyear Tire & Rubber Co., Akron, Ohio. Similar to Pliolite S-6, the new resin will be marketed as Pliolite S-6B and can be incorporated in rubber by any of the established techniques as well as by the direct Banbury mixing method.

Said to give greater plasticizing action at lower processing temperatures, the improved resin can be used in shorter and more rapid mixing cycles. In addition to shoe sole stocks, the product can be used in rubber flooring, wire insulation, gaskets, hose, and coated fabrics.

Polyamide Suspensoids

SEMI-commercial quantities of new, opaque-white, water suspensions of polyamide resins are now being offered by General Mills Research Laboratories, Minneapolis 13, Minn. Formed by the condensation of dimerized vegetable oil acids with ethylene diamine, they are widely used as heat-sealing adhesives and as water-vapor resistant coatings for paper, plastic films, and metal foils. According to General Mills, these suspensoids have a relatively high percentage of solids; eliminate the need for using hot-melt equipment or flammable solvents; make it possible to control the penetration of resin coatings into paper or other materials; and are relatively odor-free.

The resins are said to heat seal and adhere firmly to a wide variety of materials including fabrics, metals, paper, leather, plastic films, and wood, and are resistant to water, grease, and oil.

COMPANY NOTES

Pittsburgh Coke & Chemical Co., 1970 Grant Bldg., Pittsburgh 19, Pa., will soon join the firms producing and marketing a full line of plasticizers. The line will include: dibutyl, dioctyl, and diisooctyl phthalates; diisooctyl and nonyl adipate; dioctyl and dibutyl sebacate.

Westinghouse Electric Corp., Pittsburgh, Pa., has announced that two executives have exchanged positions in order to bring about closer cooperation and understanding between different company divisions. **Tom Turner**, vice president, will take charge of plant labor relations, succeeding **W. O. Lippman**, vice president, who will replace him as head of the Elevator Division.

John Waldron Corp., New Brunswick, N. J., has acquired **Meadows Machine Works** of South Kearney, N. J. The present line of the former company's heavy-duty web-processing machinery will now be supplemented by the Waldron-Meadows medium duty machines for the converting industry. **William J. Cullen**, founder and general manager of Meadows, has joined Waldron in an official capacity.

Panelyte Div., St. Regis Paper Co. announces its entry into the injection molding field, with equipment at its Trenton, N. J., plant. One machine is now in production; a second being installed is reported to be capable of producing the largest single injection molded pieces yet attained. A new building has been designed specifically for the purpose, with complete facilities provided for air scrubbing.

Crain-Ambrose Co., Ltd., P. O. Box 7023, Fort Worth 11, Texas, has purchased from **French Williams Co.** entire rights to distribution of the new-type molds reported on page 172, May MODERN PLASTICS. The mold parts are cast by patented process from inexpensive patterns of plastics, plaster of paris, wood, and other easily worked materials. Crain-Ambrose announces that it has added a die-polishing and matching department to assure its customers of the advantages and time saving involved in tooling. The company will polish the cavities or cores of straight parting surfaces and will polish and match the parting surfaces of irregular castings.

Ideal Novelty & Toy Co., New York, N. Y., has promoted two sales executives to posts as officers of the company. **I. H. Bernhard** becomes assistant vice-president in charge of sales, while **Irving Cohen** has been named assistant vice-president in charge of Mid-West sales activities.

Reichhold Chemicals, Inc., Detroit, Mich., has acquired **Nobell Resins Co.**, Azusa, Calif., which will be operated as the firm's Pacific Southern Div. under the general supervision of **M. W. Reece**. This transaction provides the company with facilities for manufacturing a wide

PLASTISCOPE

range of synthetic resins, in addition to the only phenol plant on the West Coast.

Erie Resistor Corp., Erie, Pa., has announced the expansion of its Plastics Div. with the purchase of a new building having two and a half times the present space. The company has installed two 60-oz. injection presses, along with three of smaller capacity. The machines will use about two carloads of molding powder a week.

American Electro Products, Inc., 1358 Thomaston Ave., Waterbury 14, Conn., has announced completion of facilities for metallizing plastics. Finishes may be copper, nickel, silver, gold or any other metal with high luster or satin finish.

Bakelite Div., Union Carbide and Carbon Corp., has announced plans for a new plant at South Charleston, W. Va., for the production of polyethylene. Plant capacity is expected to almost double the present production rate of Bakelite polyethylene. The new facilities, which are scheduled to be in full operation by the summer of 1951, will be operated by the Carbide and Carbon Chemicals Division.

Precision Extruders, Inc., producer of polyethylene squeeze bottles, has moved to a new plant located at 55 Westervelt Ave., Hawthorne, N. J.

Atlas Powder Co. announces the appointment of **Joseph H. Harris** as sales manager of the North Chicago branch of the Industrial Finishes Department. **Avery Doolittle** succeeds him as manager of customer service. **Benedict H. Meyer** has been named representative for Zapon finishes in Iowa, Nebraska, Kansas, and western Missouri, with headquarters in Des Moines.

Monsanto Chemical Co., St. Louis, Mo., has announced some personnel changes in its research staff. **Howard K. Nason** has been appointed assistant to **Dr. C. A. Hochwalt**, vice president and coordinator of research, development, and patent activities, and will be succeeded by **Dr. Nicholas Samaras** as director of the Central Research Department. **Harold W. Mohrman** will take Dr. Samaras' place as director of the Plastics Div. research department with **Erwin G. Somogyi** as associate director.

Process Industries Engineers, Inc., 5941 Baum Blvd., Pittsburgh 6, Pa., has announced the formation of a manufacturing division to accommodate the demands for fabrication of specially engineered equipment for the chemical, petroleum, food, and allied industries.

Plax Corp., Hartford, Conn., manufacturer of extruded plastics products, has moved its New York sales office to International Building, 630 Fifth Ave.

Acheson Colloids Corp., Port Huron, Mich., manufacturer of dispersed pigments for paints, coatings, inks, textiles, and plastics, has opened new headquarters for the Dispersed Pigments Div. at 420 Lexington Ave., New York, N. Y. The new department headquarters and staff will be headed by **George Houston**, recently named technical sales representative of that division.

Sterling Electric Motors, Inc., Los Angeles, Calif., has elected **Carl E. Johnson**, former president of the firm, chairman of the board. **Earl Mendenhall** will assume the presidential duties.

General Electric Co., Pittsfield, Mass., has named **G. S. Berge** as sales development supervisor for silicone rubber, while **J. A. Buckley** has been appointed to the same position for extruded plastics products. **John H. Field** will become general foreman at the Decatur, Ill., plant of the Plastics Div., and **Henry Semler** has been named manager, succeeding **Halsey J. Sorrell** who has been appointed to sales duties with headquarters in Chicago.

The Dow Chemical Co., Midland, Mich., has announced the appointment of **Leland A. Doan** as assistant sales manager of the Great Western Div. with headquarters at San Francisco. **Homer L. White** will succeed him as head of the Los Angeles office. **Parker Frisselle** has been named manager of Market Research.

Rohm & Haas Co. has moved the New York City offices of its Plastics Dept. to more adequate quarters at 350 Fifth Ave., Room 4919.

American Cyanamid Co., New York, N. Y., has announced the formation of the Dyes and Chemicals Export Dept. which will handle all foreign activities in connection with the products of the company's Calco Chemical Div., Industrial Chemicals Div., and Plastics and Resins Div. The combined department will be under the direction of **Fraser M. Moffat, Jr.**

Mayflower Electronic Devices, Inc., 6014 Hudson Blvd., W. New York, N. J., has designed and built an automatic electronic bonding machine for Plastic Film Corp. The machine turns out a complete pinch-pleat drape every 10 sec. and also bonds the rod pocket on the drape. Mayflower also announces that it is building an automatic rotary quilting machine which welds two pieces of vinyl film through a 3-oz. cotton batting filling.

Koppers Co., Inc. has announced that it has taken over compounding and marketing the Resorsabond adhesives developed by **Emlenton Resins Co.**, Emlenton, Pa. No transfer of property or equipment is involved in the arrangement.

Aircraft Specialties Co., Inc., 37 W. John St., Hicksville, N. Y., has announced the formation of a new division to manufacture Strux under license agreement with E. I. du Pont de Nemours & Co., Inc. Formerly marketed as CCA, this cellular cellulose acetate is an expanded plastic material made by an extrusion process and used chiefly in the fields of aviation and electronics. It is said to be well adapted to sandwich construction because of strength and because it may be used with relatively high temperatures. **Dan B. Hains** has been named vice president and general manager of the Strux Div, with **Henry F. Weinkam** as production manager.

United States Gasket Co., 602 N. 10th St., Camden, N. J., has announced that it is now ready to make immediate delivery from a wide selection of Teflon stock. Available are Teflon sheets and strips, blocks,

Hand your headaches to "CUBEE"

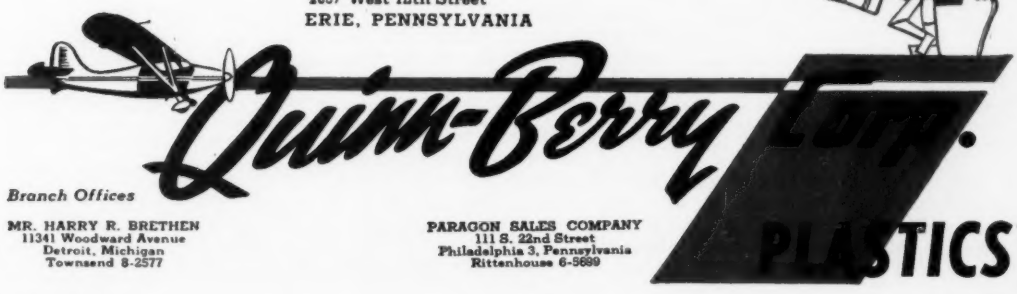
curing Plastics Problems is his business!

Take advantage of experience the next time you have a problem involving Plastics. Five of the key people here have a total of more than 75 years experience in this business.

We offer all of the services you need—designing, die-making and molding—all under one roof. It pays to utilize our "know-how". After all, Plastics is our business. Call "Cubee" the next time you are planning in Plastics.

Q-B Says:
"The next time you are stymied
And a problem's got you down,
Hand your headache to Cubee
He can wipe away that frown."

QUINN-BERRY CORP.
2657 West 12th Street
ERIE, PENNSYLVANIA



Branch Offices

MR. HARRY R. BRETHEN
11341 Woodward Avenue
Detroit, Michigan
Townsend 8-2577

PARAGON SALES COMPANY
111 S. 22nd Street
Philadelphia 3, Pennsylvania
Rittenhouse 6-5699

PLASTISCOPE

rods, tubing, bars, and cylinders. The material, developed by Du Pont, is a tough, waxy solid, with complete chemical inertness, and highly resistant to abrasion.

Reed-Prentice Corp., Worcester, Mass., has announced the opening of a Chicago sales office to be headed by **J. H. Wolcott. Iver J. Freeman** will replace Mr. Wolcott as manager of the Los Angeles branch office.

Banner Plastics Corp. has moved to 80 Beckwith Ave., Paterson, N. J., where it will occupy 200,000 sq. ft. on one floor of the old Wright Aeronautical building. The company proposes to set up one of the most modern toy manufacturing plants in the world.

PERSONNEL

Charles W. Kleiderer has been elected vice president of **Arnold Brilhart, Ltd.**, Mineola, N. Y. He will also continue in his present capacity as sales manager. Mr. Kleiderer was coordinator of plastics used in the proximity fuse program during World War II.

John C. Cotner has been appointed president of **The Hydraulic Press Mfg. Co.**, Mount Gilead, Ohio. Mr. Cotner has been president of the Logansport Machine Co., Inc., Logansport, Ind., vice president of Gerotor May, Inc., Baltimore, Md., and president of Consolidated Industries, Lafayette, Ind.

David B. Hatcher has been moved up to the position of sales manager for glues and industrial resins of **Plaskon Div., Libbey-Owens-Ford Glass Co.** Dr. Hatcher was formerly an associate director of Plaskon research.

Lloyd R. Marentette has been appointed general sales manager of **Cadillac Plastic Co.**, Detroit, Mich. **Elmer L. McIntire** also joins the firm's sales organization.

Clyde O. DeLong has been named general manager of the plastics division of **The B. F. Goodrich Co.** in charge of manufacturing and sales. Mr. DeLong, whose headquarters are in the company plant at Marietta, Ohio, became associated with the firm in 1928.

C. Elmer Gischel has been named sales promotion manager for **Heli-Coil Corp.**, Long Island City, N. Y.

Thomas C. Hardwick has been appointed sales representative for the Columbia Chemical Div. of **Pittsburgh Plate Glass Co.** at Charlotte, N. C. He joined the company in 1946.

Al Neveu, 16 Williams St., Taunton, Mass., has joined the sales department of **Plastic Molding Corp.**, Sandy Hook, Conn. He will handle sales in the northeastern New England states.

Kenneth Vandenbree has been appointed assistant sales manager of **The Standard Machinery Co.**, Mystic, Conn., manufacturer of extruding machines for the plastics, rubber, and insulated wire industries.

Robert H. Kittner has been named production manager of **Industrial Rayon Corp.** with headquarters at the company's general offices in the Union Commerce Building, Cleveland, Ohio. He was formerly with The Glenn L. Martin Co.

Charles P. Joslyn has resigned as manager of the **General Products Div.** of **The Goodyear Tire & Rubber Co.** to enter his own private business. He has been with the firm since 1926.

Mario J. Petretti, 1831 Northampton St., Holyoke, Mass., has resigned as assistant to the president in charge of manufacturing for **Rogers Plastic Corp.**, West Warren, Mass.

John Neuman has been named plant manager of **Midland Die & Engraving Co.**, Chicago, Ill. He previously owned and operated **Newark Plastic Molds**, Newark, Ohio.

Ralph B. Symons has been appointed exclusive representative in the six New England States for **The Sinclair-Collins Valve Co.**, Akron, Ohio, manufacturer of automatic valves and cycle controllers for the plastic and rubber industries. His headquarters are at 3571 Main Rd., Tiverton, R. I.

Myron A. Wick, Jr., has been elected president of **Plastic Manufacturers, Inc.**, Stamford, Conn., contract manufacturer of plastics parts and plastics and metal assemblies to specification.

Robert D. Sackett has been named a technical service representative in the thermoplastics sales department of **Monsanto Chemical Co.'s** Plastics Division.

Wallace B. Ross has joined the staff of **Thermold Corp.**, Clinton, N. Y., as vice-president and manager of sales. He was formerly vice-president of Diemolding Corp.

Edmond J. Hagan has been appointed sales representative for the Press and Power Tool Dept. of **The Baldwin Locomotive Works**, Philadelphia 42, Pa. Mr. Hagan will cover northern New Jersey, New York, and New England, working out of the New York District Sales Office.

Nathan Lester, founder and president of Lester Engineering Corp. and Lester-Phoenix Inc., Cleveland, Ohio, died suddenly on June 10 at the age of 66. Mr. Lester, known and beloved by the entire plastics industry, was one of the earliest pioneers in the development and production of injection molding equipment in the United States.

MEETINGS

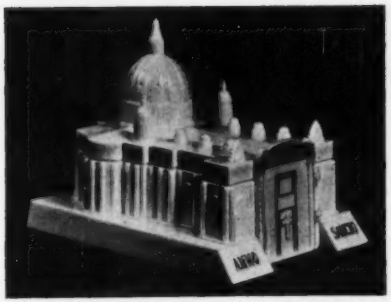
June 26-30—A. S. T. M. Exhibit of Testing Apparatus and Related Equipment, Atlantic City, N. J.

July 22-27—New York Curtain and Drapery Show, New York.

Aug. 7-20—United States International Trade Fair, Chicago, Ill.

Sept. 5-9—Chicago Section of the American Chemical Society, Sixth National Chemical Exposition, Chicago Coliseum, Chicago, Ill.

Sept. 10-13—American Institute of Chemical Engineers, Regional Meeting, Radisson Hotel, Minneapolis, Minn.



Molds by Rochelle Plastic Mold Co.—Molded by Tech-Art Plastics

The Fidelity and Dependability of TRU-CAST BERYLLIUM COPPER

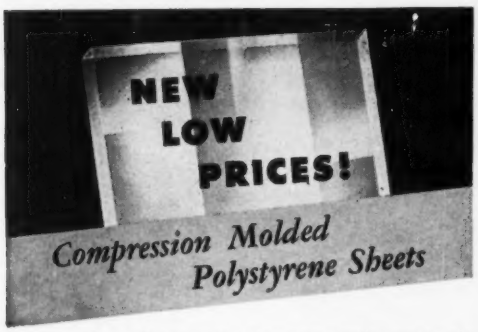
is evident in this fine Plastic Replica of St. Peter's Cathedral.

Write for our new Brochure

BERYLLIUM COPPER AT ITS BEST — TRU-CAST by MANCO

MANCO PRODUCTS CO.
2401-2409 Schaefer Road
Melvindale • Michigan

Metropolitan New York: 366 Madison Ave., New York 17, VAnderbilt 6-3417; Pacific Coast: 8442 State St., South Gate, Calif., LUcas 3601; New England: 403 Statler Office Bldg., Boston, Mass. Hancock 6-5904; Pennsylvania & New York: 291 Delaware Ave., Buffalo 2, Madison 3331; Minnesota & Wisconsin: 637 Sexton Bldg., Minneapolis 15, GEneva 4275; Illinois: 5129 W. Devon Ave., Chicago 30, RObney 3-3636; Ontario: 2049 Dundas St. W., KE 1502.



In order to move them promptly, extremely attractive prices are available on Acadia Synthetic Products compression molded polystyrene sheets in all thicknesses from ⅛" to 1". These sheets have properties superior to those fabricated by other methods—no shrinkage at normal temperatures—better heat resistance. New low prices are also available on Saran*, Tenite, Vinylite and other thermoplastic sheets. Wire or write for quotations. *(*Dow Chemical Co.)*

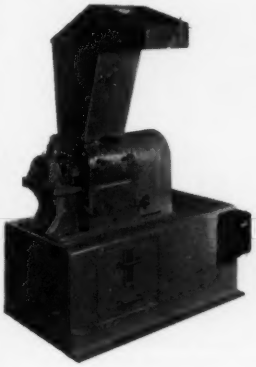
DIVISION WESTERN FELT WORKS
Largest Independent Manufacturers and Cutters of Felt
4033-4117 Ogden Avenue, Chicago 23, Illinois

ACADIA Synthetic **PRODUCTS**
Processors of Synthetic Rubber and Plastics • Sheets Extrusions • Molded Parts
LARGEST INDEPENDENT MANUFACTURERS AND CUTTERS OF FELT

B&J BRINGS OUT 8" x 8" THROAT—

model no. 251

- 100-150 lbs. per hr. capacity
- large hopper
- 24" deep, 36" wide, 50" high for minimum floor space
- low priced.



It's the most modernized rotary cutter for grinding departments, or mounting beside injection molding machines . . .

. . . for grinding large, thin sections without precutting as well as irregular gates and sprues, records, doll heads, reject parts and scrap.

Do your production requirements call for a table model midget cutter with a 5½" x 6" throat opening, 50 to 75 lbs. per hr. capacity? Check into the new B & J midget.

ASK YOUR NEAREST REPRESENTATIVE

CHICAGO: Neff, Kohlbusch & Bissel Inc. DETROIT 19: Thoreson-McCosh. LOS ANGELES & SAN FRANCISCO: Machinery Sales Co. New England: Standard Tool Co., Leominster, Mass. ATLANTA: George L. Berry. ST. LOUIS: Larrimore Sales Co., CLEVELAND 22; L. F. Willmott. SEATTLE 4: Olympic Supply Co. KANSAS CITY, KANS: Fluid Air Engineering Co. MINNEAPOLIS: Winston Henning Co., Chas. W. Stone Co. CINCINNATI: Index Machinery Corp. DALLAS: Perry Machinery Corp. CANADA: Williams & Wilson, Ltd. Toronto & Montreal. FRANCE: Impertexo, Paris 1. Foreign Distributors: Omni Products Corp., New York 16.

BALL & JEWELL, INC.

22-28 Franklin Street
Brooklyn 22, New York

1865 — 1950

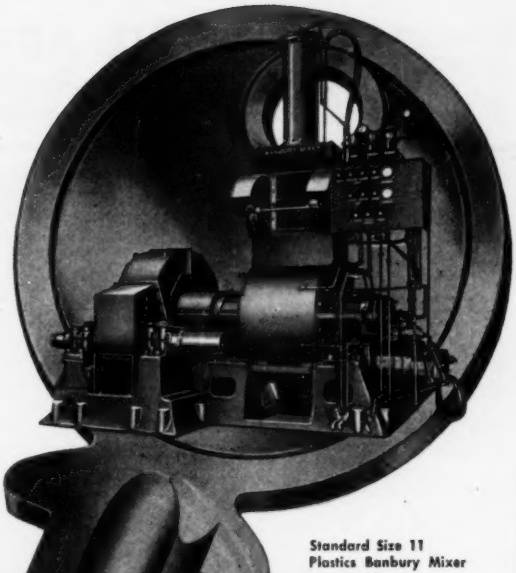
IN MANY CASES THE BANBURY PROVIDES

The Key To Efficient Processing

Where a Banbury mixer is to be an important unit in the production line, the efficiency of the entire setup can often be regulated by carefully planning the installation and operation of this unique machine in advance.

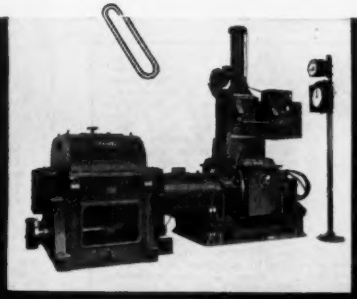
Banbury mixers are available in a wide range of sizes, which means that a machine of the proper pounds-per-hour output can be chosen to match the capacities of the other units in the line. Methods of installing Banburys have been developed which now make it possible practically to eliminate the manual handling of stock to and from auxiliary equipment.

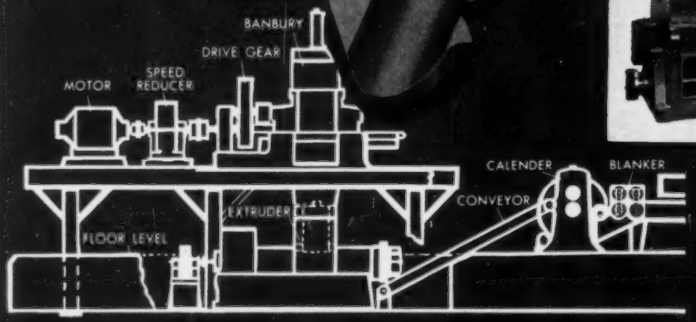
Improvements in operating technique and in the design of the machine itself have made the production of successive batches more and more uniform. With the addition of control equipment, such as a timing device, temperature recorder and discharge mechanism, each operation in the mixing procedure can be automatically controlled and an even flow of production assured.



Standard Size 11
Plastics Banbury Mixer

Write for further information about the Banbury mixer or for engineering assistance in designing an efficient processing layout.





Farrel-Birmingham®

CLASSIFIED ADVERTISEMENTS

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (used or resale only)

Machinery and Equipment FOR SALE

PRICED TO SELL
INJECTION MOLDING MACHINES

32-48 oz. Impco Injector, new '45, used in conjunction with standard plastic press for large molds $9900.00
8-12 oz. W.S. new '45 running..... 6950.00
8 oz. W.S. '41, overhauled '43 ..... 6950.00
6 oz. W.S., new '42 ..... 4500.00

PLASTIC HYD. PRESSES Self Contained
Southwk. latest type, 260 T, 24"x34" Offers
H.P.M. 200T, SE Type, ram 14"x 13½", platen 36"x36" Offers
Southwk. 350 T. platen 24"x42", 2-12" cyl. 1750.00
Fr. Oil 200T, 16" ram, platen 24"x24", new '42 ..... 2975.00
Plastic Try Out Screw Press, new '47, platen 36"x36" 1250.00

HYD. PUMPS

Loewy, 2500PSI, 270 gal., '44 ..... 8500.00
H.P.M. 2200PSI, 20 gal., new '43, 15HP 1250.00
W.S. 2000#, 5.8GPM, new '41 ..... 575.00
New Vicker's M. V135, 15HP, 1000#, 176GPM 495.00
Northern, 15GPM, 15HP, 2600#, excellent 750.00

MISCELLANEOUS

Farrel Reducer 500HP, new '43, 5 to 1 ..... 2500.00
Devine Vulcanizer & Vac., 3'6"x4', hyd. 800.00
P&W Model BL2416, Keller Duplicator, Plastic 6500.00

EVEREADY CO., E. J. McCALLUM, PRES.
805 Housatonic Ave. Bridgeport, Conn.

FOR SALE: NRM Package Unit plastic wire covering machine, slightly used. Consists of 1½" oil heated extruder, crosshead for max. of ¼" dia. covered wire, dual horizontal water cooled haul-off capstans, automatic driven let-off controlled by wire tension, torque controlled dual take-up. 220V 2 phase. Can be operated for inspection. IRVINGTON VARNISH & INSULATOR CO., 6 Argyle Terr., Irvington 11, N. J. Essex 3-4200 Ext. 6

FOR SALE: 100 Ton and 150 Ton Stokes Molding Press & Pumps; 200 Ton H. P. M. Self Contained Molding Press; 300 Ton Dunning & Boschert, Molding Press; 300 Ton W. S. New Hobbing Press; 300 Ton W. S. Press 24 x 20 Platens; 175 Ton H. P. M. 30 x 30 Platens; 85 Ton Stewart Bolling 20 x 20 Platens With Electric Plates; 50 Ton 18" x 18" Elmes, With Electric Plates, Handpump Operated; 500 Ton Waterbury Farrel 3 Post Press; 800 Ton Waterbury Farrel 22" x 24" Platens; Watson-Stillman 75 Ton 15" x 15" Platens; 160 Ton W.S. 18" x 18" Self Contained Press; Carver & Watson Stillman Lab. Presses; Hydro Pneumatic & other type Accumulators; Piston & Oil Pumps. AARON MACHINERY CO., 45 Crosby St., N.Y.C.

SAVE WITH GUARANTEED REBUILT EQUIPMENT — HYDRAULIC PRESSES, 24" x 24", 18" ram 318 tons; 24" x 56", 450 ton multiple opening; 24" x 24", 16" ram, 250 tons; 24" x 24", 12" ram, 170 tons; 24" x 42", 2—12" rams, 340 tons, 42" x 42", 16" ram, 250 tons; 36" x 36", 12" ram 141 tons; 20" x 18", 10" ram, 118 tons; 20" x 20", 10" ram, 118 tons; 19" x 24", 10" ram, 78 tons; 22' x 15', 8' ram, 75 tons; 27" x 21", 8" ram, 75 tons, 15" x 15", 8" ram, 75 tons; 12" x 12" 7½" ram, 80 tons; 12" x 12", 6½" ram, 50 tons; 8" x 9½", 4½" ram, 20 tons; 16" x 16", 3½" ram, 12 tons; Laboratory Presses; 10 ton Carver 6" x 6", Watson Stillman 30 ton, 6" x 6"; Laboratory Millsand Calenders (NEW) M. D.; THROPP Mill 16" x 40" M.D.; NEW DUAL PUMPING UNITS, all sizes; EXtruders; Royle Rubber #3, Royle Plastic #1, PREFORM PRESSES, Stokes T, Colton 5½T and Stokes DDS4 with Reeves Drives, also Mixers, Vulcanizers, Accumulators, etc.
Universal Hydraulic Machinery Company, 285 Hudson Street, New York City 13, N. Y.

FOR SALE: Farrell 18" x 45", 16" x 48" & 15" x 36", 2 roll rubber mills. New 6" x 12" Lab. mixing mills & calenders. Other sizes 50" to 84". Royle #2 perfected extruder, and other sizes. 500 ton Hydr. molding press 42" x 48". Field 500 ton 25" x 30", 200 ton F.B. Hydr. Molding Press 40" x 32"; 300 ton D & B Molding Press 36" x 36". Francis 175 tons 24" x 18". W.S 115 ton 2 opening 24" x 24". 40 ton broaching press. Also presses 20 to 500 tons from 12" x 12" to 36" x 36". Record Presses. Hydr. oil pumps, Vickers, Oilgear, Northern, etc. Watson Stillman hor 4 plgr. 1¼" & 2½" x 4" H & L pressure pump. HPM 1—⅜" x 6" vertical triplex 10 GPM 2700 lbs. Elmes 1" x 4" & 1—⅛" x 4" hor. 4 plgr. 5 & 8 GPM 4500 lbs. & 5500 lbs. Elmes 2" x 6" Horiz. 30 GPM 2500 psi. Rumsey 4½" x 8" vert. triplex 65 GPM 900 lbs. Hydr. steam pumps. Low pressure pumps 150 to 400 lbs. Hydr. accumulators. Stokes automatic molding presses. Stokes rotary preform tablet machines 1—3/16", 1—¼" and ⅝", also single punch. Injection molding machines 2 oz. to 16 oz. Baker Perkins jacketed mixers 200, 100, 50, and 9 gals. capacity. Lcominster hp. plastic grinder. New and used rotary cutters, #18H Mikro pulverizers, & other sizes. Rubber mills, calenders, #00 Banbury mixer, etc. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. We buy your surplus machinery. Stein Equipment Co., 90 West St., N. Y. 6, N. Y. WOrth 2-8745.

HYDRAULIC PRESSES REBUILT TO SPECIFICATIONS for plastic items, industrial purposes and phonograph record presses. We have in the used equipment (1) Baldwin-Southward 8" x 8' stroke, 2000# W. P. weighted accumulator $2000, (1) 400 ton, 32 x 45, 18" ram, 36" stroke, 12' daylight $2200 (1) 300 ton 30 x 40, 18" ram, 24" stroke, $1800, (1) 400 ton 22 x 30, 16" ram, 18" stroke, 36" daylight $1500, (2) 150 ton 42 x 46, 12" ram, 36" stroke, 60" daylight $900 each, (6) 250 ton 32 x 66 12" double ram, 48" daylight, 12" stroke, flange type packing $1350 each. Hydraulic Sal-Press Co., Inc., 356-390 Warren Street, Brooklyn 2, New York.

FOR SALE: Two 2 oz. Reed-Prentice injection machines. Good condition. Reply Box 564 Modern Plastics.

UNUSUAL OPPORTUNITY—LARGE RAM MULTIPLE OPENING PRESSES: We are selling for a customer the following: 1—Lake Erie (New 1948) 42" x 42" platen, 8 opening self-contained semi-automatic Hydraulic Hot Plate Press, 36" dia. ram with 2 lift tables. 1—Southwark 42" x 42" platen, 4 opening self-contained semi-automatic Hydraulic Hot Plate Press, 32" dia. ram with 1 lift table. UNIVERSAL HYDRAULIC MACHINERY CO., 285 HUDSON ST., NEW YORK 13, N. Y.

FOR SALE: 1—#00 Banbury Mixer with 10 HP motor; 1—Farrel 6" x 14" 2-roll Lab. Mill with motor; 6—Baker Perkins Double Arm Mixers 100, 50, 9 and 2 gallon capacity; 3—4TH, 2TH, 18H Mikro Pulverizers. Partial listing. Send us your inquiries. BRILL EQUIPMENT COMPANY, 2401 Third Ave., New York 51, N. Y.

FOR SALE: LABORATORY size double arm jacketed mixer, 3 intechangeable rotors, 3 types cover, two-speed motor. DOUBLE ARM jacketed mixers, 25 gal. to 150 gal. PERRY EQUIPMENT CORP. 1529 W. Thompson Street, Phila., 21, Penna.

INJECTION MOLDING MACHINES FOR IMMEDIATE SALE

One—8 oz. Watson Stillman
Three—6 oz. Watson-Stillman
One—8 oz. Leominster
Two—4 oz. HPM

All in Good Operating Condition. Reply Box 601, Modern Plastics.

FOR SALE: Two 2-oz. and one 4-oz. Reed-Prentice injection molding machines, used but in good repair. Write Tilton & Cook Co., Leominster, Mass.

FOR SALE: Distillation Products Corp. 7C136 High Vacuum Coating Unit, 36 inch diameter Bell jar, Four 500 Liter diffusion pumps, two D. Y. D. 8810 Kinney Pumps with Purifiers, Rotary Seal, glow discharge unit. Ten XVA filament transformer. Complete with gauges, valves and connections. Metaplast Process, Inc., 9-17 37th Ave., L. I., C., N. Y., ST 4-6314.

HYDRAULIC PRESS—700 To Capacity. Nearly new, with 4 ft. by 6 ft. multi-steam platens. Suitable for manufacture of plastics, pressed wood products, and metals. Also all necessary equipment for making 4 by 6 ft. wall panels of sawdust. For complete details, write: MIDWEST BUY ANYTHING CO., 1520 Locust St., Kansas City, Mo.

Choice Plastic Equipment At "SUPERMARKET" Prices: #00 & #3 Banbury Mixers with drive and AC motors Kelley 4½" x 12" 2-roll Laboratory Mill, heavy duty French Oil 500 ton Power self contained Hydraulic Molding Press 1, 2, 4, 6 & 16 oz. Injection Molding Machines, all makes Extruders, from size ½ to #4 Farrell 16" x 40" Cracker Mill New 20" x 24" x 36" Cracker Mill, with accessories, still in crate, 2 Roll 60" Calendar with bored Rolls. Preformers—single punch & Rotary, all sizes, all makes Heavy Duty Mixers, sigma and fish tail arms, all sizes, jacketed and unjacketed. Phone SOuth 8-4451 - 9264 - 8782. "You can BANK on the . . . EQUIPMENT CLEARING HOUSE, INC., 289 10th Street, Brooklyn 15, N. Y.

INJECTION MOLDING MACHINE: Fellows, 2 ounces, built 1947, slightly used, fast cycles. Priced right. Can be inspected in my New York warehouse.
ALFRED A. ROSENTHAL
3 Park Row, New York 7, N. Y.
REctor 2-2747

DEFIANCE #30 PREFORM PRESS: 100 Ton, factory rebuilt, complete with 220-440 v., 60 cyl., 3 ph. A C motor, Variable speed drive, electronic controls for preforming fine or granular materials, EXTRA floating head for handling cold molding materials; pressure limit indicator, 4 different die sets. Ideal flexible machine for laboratory use or can be used for production. .Used only in laboratory. DEFIANCE MACHINE WORKS, INC., c/o Room 203 Manhattan Building, 518 Jefferson Avenue, Toledo 4, Ohio.

FOR SALE: paper rolls for Cavagnaro 40 ton hydraulic embossing calender. These rolls are 22" diameter x 60" working face, equipped with herringbone connecting gears. All these rolls are in A1 shape and have been used only a few months. Price $1000.00 each. Reply Box 609, Modern Plastics.

FOR SALE: One 6 cavity new 8 oz. tumbler mold, together with enough polyethylene color concentrate to produce approximately 300,000 tumblers in 5 pastel colors. Will sell for reasonable offer. Reply Box 610, Modern Plastics.

FOR SALE: One 4 cavity combination mold for producing polystyrene pie pac. Mold in A-1 shape, ready to go. Cost $2000.00 Will sacrifice for $900.00. Reply Box 611, Modern Plastics.

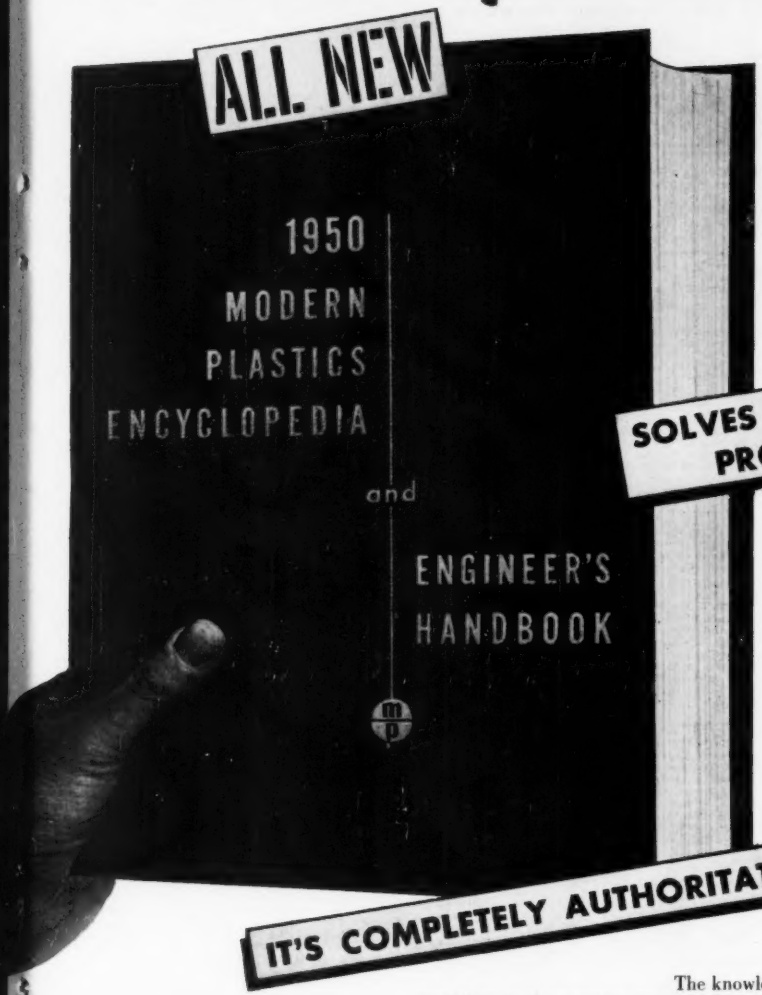
FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 613, Modern Plastics.

FOR SALE: One Electronic Processes Shower Curtain Heat sealing unit to seal 2 36" rolls of Vinyl film into 72" width, excellent condition, well priced. Reply Box 614, Modern Plastics.

FOR SALE: 1—2 roll plastic and rubber mill 42 inches x 16 inches diameter complete with 50 h.p. motor. Now operating. Can be inspected. Apply Box 615, Modern Plastics.

(Continued on page 180)

As basic as your blueprints!



gives you complete data on every phase of plastics planning and production

SOLVES ALL THESE PROBLEMS FAST!

where to use plastics
which plastic to use
how to design for plastics
what production method
how to mold, fabricate
how to finish and assemble
which machinery and equipment
where to buy materials, services and equipment

IT'S COMPLETELY AUTHORITATIVE!

Just published! 1200 fact-crammed pages! Prepared by the editors of MODERN PLASTICS Magazine!

The knowledge and know-how of the top plastics specialists in the country are embodied in this great new Encyclopedia. Here's just a partial list of companies whose experts assisted our editors: Norton Laboratories, Inc. . . . Worcester Moulded Plastics Co. . . . Tennessee Eastman Corp. . . . Celanese Corp. of America . . . Nixon Nitration Works . . . Watson-Standard Co. . . . Bakelite Division, Union Carbide and Carbon Corp. . . . United States Rubber Co., Naugatuck Chem. Div. . . . Monsanto Chemical Co. . . . Dow Chemical Co. . . . Shaw Insulator Co. . . . F. J. Stokes Machine Co. . . . Minneapolis-Honeywell Regulator Co. . . . Continental Diamond Fibre Co. . . . Carborundum Co. . . . Mack Molding Co. . . . E. I. du Pont de Nemours & Co., Inc. . . . Chicago Molded Products Co.

Order yours now! Only $3.00 anywhere in the world!

Address your order to MODERN PLASTICS ENCYCLOPEDIA and ENGINEER'S HANDBOOK, 122 East 42nd Street, New York 17, New York . . . or use the handy order form bound in this magazine between pages 134 and 135.

CLASSIFIED ADVERTISING

(*Continued from Page 178*)

FOR SALE: Injection Presses: 2, 4 & 6 oz Reeds, 2, 4 & 12 oz HPM (oil heated). 1 oz vert. bench NRK, 1 oz VanDorn. Extruders: NRM Lab bench unit, 1½" & 2½" oil heated, NRM. Ovens, Granulators, Tumbling Barrels, Temperature Circulators, Apex rd Obj. Printing mach. PRECO Labpress. 1—HPM 9 oz Hastelloy Heat. Chamber. 2—Electronic HF Generators & Sealers for Vinyls. 5—various types Compression Presses. 1—150 tons Stokes mod. 252 autom. Closure Press. 1—Stew Bolling 100 tons Recordipress. 2 Laminating Presses mult. op. 30" x 30", 30" x 60". 1—Kux 225 rotary, & 1—Stokes 280B Preformpresses. 1—Northrop 6 stations Micromax Temp. control Recorder. 1—Oilgear 15 HP 2500 lbs press, pump unit. 1—Eclipse 3 HP gas boiler. Justin Zenner, 823 W. Waveland Ave., Chicago 13, Ill.

Machinery and Equipment WANTED

WANTED: Complete plants, also individual items such as: Mixers, grinders, 2-roll mills, extruders, etc. Reply Box 558, Modern Plastics.

We have a problem in the hand cleaning and washing of large molded polystyrene pieces, approx. 12" x 12". We are interested in an efficient and automatic cleaning device or method to replace the hand operation. If you have a solution to our problem please contact us through Box 560 Modern Plastics, for further details.

New manufacturer wants injection molding machines, also extruding equipment. Will pay good prices. Reply Box 563 Modern Plastics.

WANTED High frequency electronic generators and sealing equipment used in the sealing of rigid acetate films. Also we are interested in rigid film fabricating equipment such as: creasers, continuous beaders, cylinder beaders, folding creasers, etc. Reply Box 568, Modern Plastics.

WANTED: Injection Molding Machines 4-8-12-16 oz & Larger, Any Make. EVEREADY SUPPLY CO., 805 Housatonic Avenue, E. J. McCallum, Pres. 4-9471 Bridgeport, Connecticut.

WANTED—2½" or 3½" plastic crew extruder. 2 oz. and 16 oz. injection molding machine. 2 and 15 H.P. scrap grinders. 60" and 84" calanders and mills. Send complete information. Reply Box 699, Modern Plastics.

WANTED: 2-roll 24" or 26" x 84" Plastic Mill, including Motors and Reduction Gears. Must be in good condition. Delsyd Corp., Farmingdale, N. Y.

Material For Sale

FOR SALE: 67,000 Red Cellulose Acetate Butyrate (Tenite II) 2¾" long handles, .925" OD x .760 ID for 2⅛". Tapers for ⅝" one end to 5/32" ID. First run no rejects. Approximate quantity subject to inventory. Sample on request. Biltwell Brush Co., Rockford, Illinois."

PLEXIGLAS AND LUCITE
New Material, .060, .080, .100, .125, .150, .187, .250, .312, 3.75, below list price. No charge for cutting to size. Plexiglas, Grade A, Red Fluorescent, .187 gauge, size 12" x 36". .250 Gauge, clear, 23½" x 31" special price.
ARISTOCRAT PLASTICS, INC.
55 Clarkson St., New York, N. Y.
WAtkins 4-4216.

Materials Wanted

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene. Custom grinding, magnetizing, compounding, and straining of contaminated plastics. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. ES 5-7943.

WANTED: Uncured scrap. Canvas fabric eight to thirteen ounce with 40 to 50% phenolic resin impregnate and volatile content between 5 and 7%. Job lots or production quantities. Purchasing Department, American Brake Shoe Company, American Brakeblok Division, 4600 Merritt Ave., Detroit 9, Michigan.

WANTED: PLASTIC Scrap or Rejects in any form. Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 561, Modern Plastics.

"We buy "Old UREA" molding compound or odd colors
Box 143, Arverne, New York

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic and Ethyl Cellulose. Reply Box 561, Modern Plastics.

WANTED: Polyethylene scrap, Polystyrene sheet scrap and all other types thermoplastic scrap. Reply: KAYSON RUBBER & PLASTICS LIMITED, Galt, Ontario, Canada.

Help Wanted

PLASTIC PRESS SUPERVISOR
To supervise battery of 50 compression presses and 4 injection presses. Must have thorough knowledge of plastic technique and be production minded. Excellent future in growing concern. State salary expected and past experience. Located middle west. Box 559, Modern Plastics.

Experienced plastics engineer to do injection mold design, time study, cost estimating and product design in southern Indiana. Write full details on experience, references, and salary expected. Box 603, Modern Plastics.

Sales representation in upper New York State wanted by large Midwest moulder of thermosetting plastics. Reply Box 605, Modern Plastics.

WANTED: Sales representation by Chicago Molding Company in midwest territory on commission basis. Compression Molding only. Press capacity 75 to 400 ton. A very good opportunity for salesmen or manufacturers agent familiar with plastic molding.
SNOW PLASTICS CORPORATION.
5840 So. Oakley Avenue,
Chicago 36, Illinois.

PRODUCTION MAN, experienced in production supervision, sales engineering, product design, estimating, mold design, also familiar with compression molding. Some experience in tool and die work, plant set up. Principally for custom work. Reply give full resume of training and experience, salary desired. All replies kept confidential. Jacksonville Metal and Plastics Company, P. O. Box 1827, Jacksonville, Florida.

WANTED: Chemist fully familiar with the manufacture of Urea Resins and Urea Compounds. Also needed Chemist with thorough knowledge of Melamine & its molding compounds. Excellent opportunity for the right man. Reply Box 612, Modern Plastics.

THE RIGHT SPOTS FOR THE RIGHT MEN: An unusual opportunity for resident men to exclusively represent the leading plastic fabricator in either the New England or (Philadelphia-Baltimore-Washington areas. Drawing account against commission. State full details. Steiner Plastics Mfg. Co., 47-30 33rd St., Long Island City, N. Y.

Situations Wanted

PLASTICS SALES MANAGER: With AAA-1 injection and Compression molder doing both custom and proprietary work. Thorough knowledge of plant operation and tool design. Have personally handled all custom work. Can organize and develop distribution of proprietary line through jobber channels. Member S.P.E. Many years in plastic industry. Age under forty. Resume upon request. Desire change for personal reasons. Reply Box 566, Modern Plastics.

PLASTIC ENGINEER AND EXECUTIVE. Ten years experience in the plastic field working in injection, compression, transfer, low pressure bag molding, and low pressure laminating. Experienced in supervision-executive department head, product design, drafting, development, production, plastic material control, physical and chemical testing, and sales service. Excellent references. College graduate-Chemical Engineer. Age 33. Prefer Midwest. Reply Box 569, Modern Plastics.

STYLIST, DESIGNER: For Plastics Consumer Products, seeks staff position with reputable, progressive plastics molding company or fabricator making proprietary line of household, housefurnishings or fashion accessories, novelties, religious items or gadgets. A creative talent well rounded in essentials that make for contemporary smartness in styling and design, a keen insight of consumer preferences and technique slanted for greater sales returns. Reply 604, Modern Plastics.

GENERAL MANAGER: PLASTICS: Graduate Mechanical, Industrial Engineer. Extensive business, manufacturing background. Qualified to layout, set up plant; organize direct all phases company operations, including SALES, merchandising, advertising, personnel, accounting, engineering, purchasing, sub-contracting, production-material control, methods-standards, Cost Reduction, injection-transfer-compression-coinoid moulding, fabricating, finishing, sub-final assembly, quality control, warehousing, traffic, maintenance. Proven managerial achievement, successful labor relations. Reply Box 606, Modern Plastics.

PLASTIC MOLDER: Compression and Injection molding. 10 years practical experience, from preform room through molder, maintenance, press room foreman, engineering to plant superintendent of small plant. Technical education, complete responsibility production and maintenance. Estimating, thorough knowledge of latest methods, materials and mold design. Age 40, married, presently employed. Good references, excellent reason for desiring change. Reply Box 608, Modern Plastics.

Miscellaneous

Manufacturers' Representatives well known to wholesale toy, paper, hardware, drug, motion and novelty trade in Pennsylvania, New Jersey (Trenton south), Delaware, Maryland, Washington, D. C., desire additional resale items applicable to these outlets. Complete and thorough coverage. Extensive refrences. Also call on department and syndicate stores. Reply Box 567, Modern Plastics.

A well known British light engineering company specializing in electro-mechanical units, fluorescent lighting, switches, and compression mouldings of all kinds, would welcome suggestions for co-operation on technical and other matters. Would also consider the manufacture of domestic plasticware from American tools on a fair trading basis. Replies which will be treated in strict confidence should be addressed to Box 607, Modern Plastics.

WANTED: PLASTICS EXTRUSION OR PAPER CONVERTING PLANT: We are two men who wish to purchase, or buy into, a going plant. Our thoughts are flexible, depending upon the proposition submitted. One of us is a successful, experienced merchandiser, and the other is an equally qualified chemical engineer and production man. We have the promotional ability and the technical know-how. Replies will be held in strict confidence. Would you please outline sufficient details of plant and business in your letter for preliminary consideration. Reply Box 616, Modern Plastics.

WANTED: We are interested in purchasing discontinued molds for plastic injection moulding machines. Reply Box 602, Modern Plastics.

Will buy injection molds suitable for 4 & 8 oz. machines. Ballard Adv. Nov., Keyport, N. J.

Zenith announces ZENALOY

The MULTI-PURPOSE LAMINATED MATERIAL of 1950!

HERE IS A *New* R. P.* MATERIAL

of laminated FIBERGLAS that combines an amazing number of advantages for a broad field of products ...both articles and parts...that ZENITH equipment and engineering skill can now produce in superior quality with *economy*.

ZENALOY replaces steel at one-fifth the weight. It is 25% lighter even than aluminum, produces complete shapes without stamping or spinning and makes possible deep-drawing parts in one single, efficient operation.

ZENALOY won't rust or warp; resists heat and cold and other climatic changes; and presents no finishing problem, since it has the same surface inside and out.

Find out NOW how much LESS it would cost or how much BETTER your product (or part) can be made in **ZENALOY**...by ZENITH. Write, wire or phone to...

ZENITH can produce in ZENALOY:
Furniture, Refrigerator interior insulation; Step-cans, Pails, Waste-baskets and other housewares; Torcheres and bowls for lighting fixtures; Housings, etc., etc.

R.P.* REINFORCED FIBERGLAS PLASTICS

ZENITH PLASTICS CO.

1600 W. 135th St. · Gardena, California · Plymouth 4-2934

INDEX OF ADVERTISERS

JULY 1950

MODERN PLASTICS

122 EAST 42nd STREET • NEW YORK 17, N. Y.

a plastics injection to keep your product "see-worthy"

With point-of-sale merchandising at a high pitch, the success of your product depends to a large extent upon its "see-worthiness". If your product has symptoms of "see-sickness", give Worcester Moulded Plastics the opportunity to supply the remedy. As the largest custom injection moulders in the East, we will redesign and mould it in durable, "aye" catching plastics — to assure you of a good seller. Since we have no proprietary interest in any package or product we produce, our engineers, die designers, die makers, moulders, finishers and inspectors are interested solely in the success of your product. Give us the opportunity to discuss the benefits of a plastics injection for your product.

Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

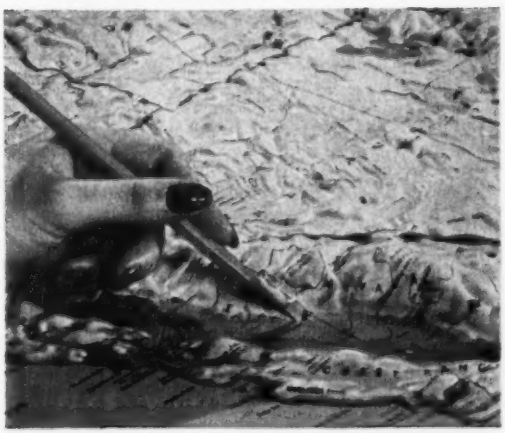
14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

Vinylite Plastic Rigid Sheet BRAND

MAPS THE WAY TO TAP NEW MARKETS!

Relief map courtesy Aero Service Corp., 236 E. Courtland St., Philadelphia, Pa.



NEW, full-color relief maps molded from VINYLITE Brand Plastic Rigid Sheet are just what the teacher ordered. Strong, lightweight and washable, they cost far less than conventional, highly fragile custom-built plaster. They are lithographed in 11 colors before forming. Altitude exaggerations of 20 to 1, dramatize both the material's ability to be deep drawn . . . and the map relief.

It is just one example of the trail-blazing versatility of VINYLITE Rigid Sheets. They are simply and inexpensively formed into three-dimensional dress dummies. They make realistic dolls faces and multi-colored lampshades that resist washing, soaps, and perspiration. Transparent, translucent, or opaque displays of them give startling and beautiful effects.

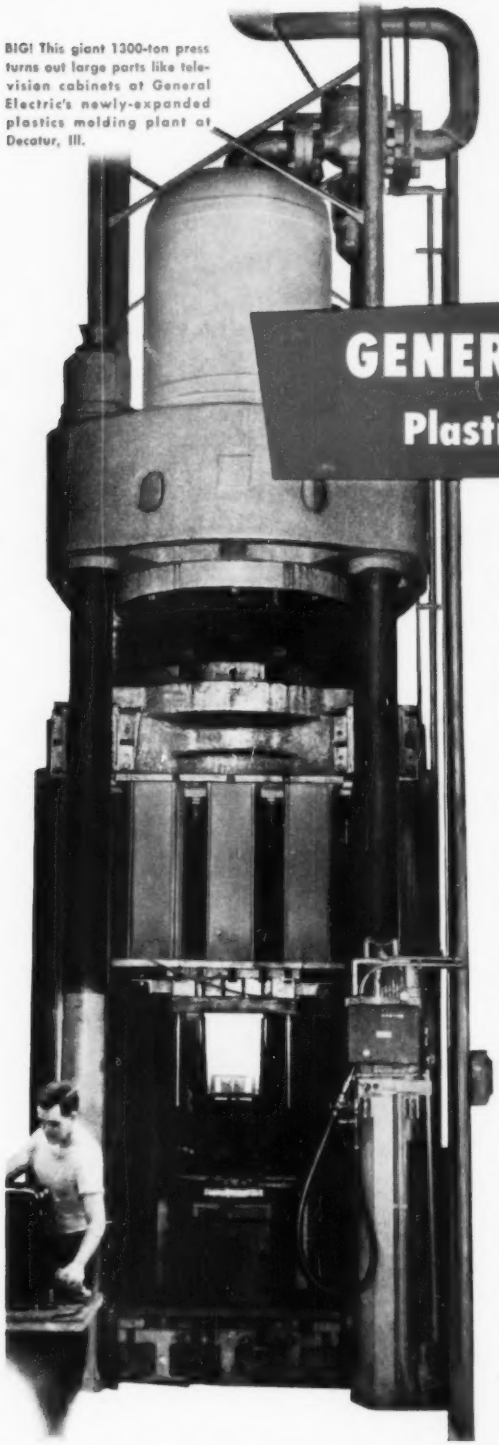
These amazing materials come in a multitude of colors—or clear. They are virtually unaffected in shape, dimension or other qualities by changes in temperature, moisture, alkalies, most strong acids and other chemicals. They will not support combustion. They are used for 4-color photographic transparencies, precision drafting instruments, price tags, templates, business calendar cards, display packages, many more things.

VINYLITE Plastics have a place in your efforts to better your product and capture new markets. Let plastics engineers of Bakelite Division show you how. Write Dept. IQ-7.

Vinylite BRAND **PLASTICS**

BAKELITE DIVISION UCC

BAKELITE DIVISION, *Union Carbide and Carbon Corporation,* 30 East 42nd Street, New York 17, N. Y.



BIG! This giant 1300-ton press turns out large parts like television cabinets at General Electric's newly-expanded plastics molding plant at Decatur, Ill.

USERS OF PLASTICS PARTS!

You can get quick delivery, low-cost production from

GENERAL ELECTRIC

Plastics Molding Service

Here's tremendous plastics production capacity to serve users of plastics parts and products. General Electric's three modern and complete plastics molding and extruding plants, in the Midwest and East, are equipped to offer:

Immediate Delivery on compression molding jobs. Presses are available—G.E. can start producing parts from your molds at once. On new molds, our engineering and mold manufacturing facilities permit you to get fast production on even large-size parts.

General Electric's press capacity makes it one of the largest—if not the largest—molder in the country. Injection, compression, and extrusion machines of all types and sizes make for fast, efficient production.

Cost Reductions can usually be effected, where large-volume runs are concerned. These are based on operating economies due to G.E.'s ability to work with *all* types of plastics materials—to select, without bias, the right one for *your* job.

Big Jobs Economically. G.E. is molding television and radio cabinets, crisper boxes and meat trays for refrigerators—*big* jobs, *long-run* jobs, where engineering and plastics "know-how" are vitally important.

Years of Experience. General Electric offers you the benefit of its 56 years of experience in the designing, engineering, and molding of plastics parts. You can depend on G.E. for a plastics service that may substantially cut your costs or improve your product.

How can G.E.'s Plastics Molding Service Work for You? If you have a large-volume plastics job under consideration, let a G-E plastics engineer discuss with you the advantages that General Electric can offer you. No obligation of course. Just write General Electric Company, 1 Plastics Avenue, Pittsfield, Massachusetts.

FREE! Write on your letterhead for the free illustrated booklet, "Your Plastics Dollars Worth." It may save you money.

You can put your confidence in

GENERAL ELECTRIC